

THE HEALTH OF LINN COUNTY, IOWA

A COUNTY-WIDE ASSESSMENT OF HEALTH STATUS AND HEALTH RISKS

Project Team

Pramod Dwivedi, Health Director

Amy Hockett, Epidemiologist

Kaitlin Emrich, Assessment Health Promotion Manager

Questions and Comments

Linn County Public Health

501 13th Street NW

Cedar Rapids, Iowa 52405-3700

health@linncounty.org

319-892-6000

Copyright Information

All material contained in this report is in the public domain and may be used and reprinted without special permission; however, citation as to source is appreciated.

Suggested Citation

Linn County Public Health. The Health of Linn County, Iowa: A countywide assessment of health status and health risks. Cedar Rapids, IA: Linn County Public Health. December 2017.

Web Site

The online version of this report is available at www.linncounty.org/health



Public Health
Prevent. Promote. Protect.

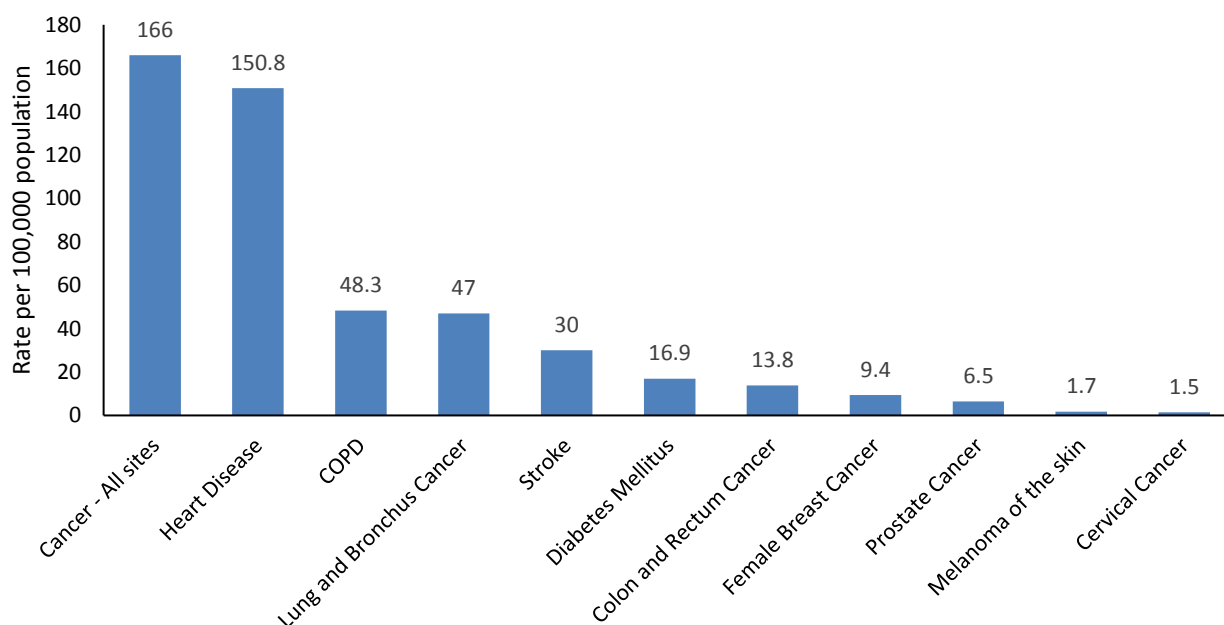
Linn County, Iowa

Chapter 4 Chronic Diseases

Introduction

Chronic diseases, including cancer, heart disease, stroke, diabetes, asthma, chronic obstructive pulmonary disease and obesity, are the most common causes of death and disability in the United States⁴. Chronic diseases are the most costly category of diseases, with an estimated 75% of all health care costs due to chronic conditions, and they are the most preventable⁵. Risk factors vary by the disease, but four behaviors – tobacco use, insufficient physical activity, poor eating habits, and excessive alcohol use – are the leading contributors to chronic disease. Chapter 4 covers several chronic diseases, including cancer (breast, cervical, colorectal, lung, melanoma of the skin and prostate), heart disease, stroke, diabetes, asthma, chronic obstructive pulmonary disease (COPD), and obesity. Figure 4.1 compares the age-adjusted mortality rates for each disease discussed in this chapter.

Figure 4.1 Age-adjusted mortality rates for selected chronic diseases, Linn County, 2010-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program, Iowa Public Health Tracking Portal, and Vital Records, Bureau of Health Statistics, Iowa Department of Public Health

⁴ Centers for Disease Control and Prevention. Chronic Diseases and Health Promotion. *Centers for Disease Control and Prevention*. [Online] 8 13, 2012. [Cited: 12 3 2013.] <http://www.cdc.gov/chronicdisease/overview/index.htm>

⁵ The Power to Prevent, The Call to Control: At A Glance 2009. *Chronic Disease Prevention and Health Promotion*. [Online] 12 17, 2009. [Cited: 12 3 2013.] <http://www.cdc.gov/chronicdisease/resources/publications/AAG/chronic.htm>

Obesity

Since the late 20th century, an obesity epidemic has occurred nationwide. Among states participating in the Behavioral Risk Factor Surveillance System, no state had obesity prevalence of greater than 15% in 1990, yet 20 years later in 2010, no state had prevalence of less than 20% obesity.⁶ Obesity is a contributor to many chronic health conditions including heart disease, hypertension, stroke, type 2 diabetes and certain types of cancer, among others. The estimated annual economic burden is \$147 billion.⁷

Linn County 2020 Goal

Increase the proportion of adults who are at a healthy weight to 41.9%, a 10% improvement from the 3-year average of 38.1% in 2008 to 2010.

Reduce the proportion of adults who are obese to 24.4%, a 10% improvement from the 3-year average of 27.1% in 2008 to 2010.

Reduce the proportion of children and adolescents who are considered obese to 13.3% among kindergarteners and 20.7% among 5th grade students, a 10% improvement from obesity measured among students in 2013.

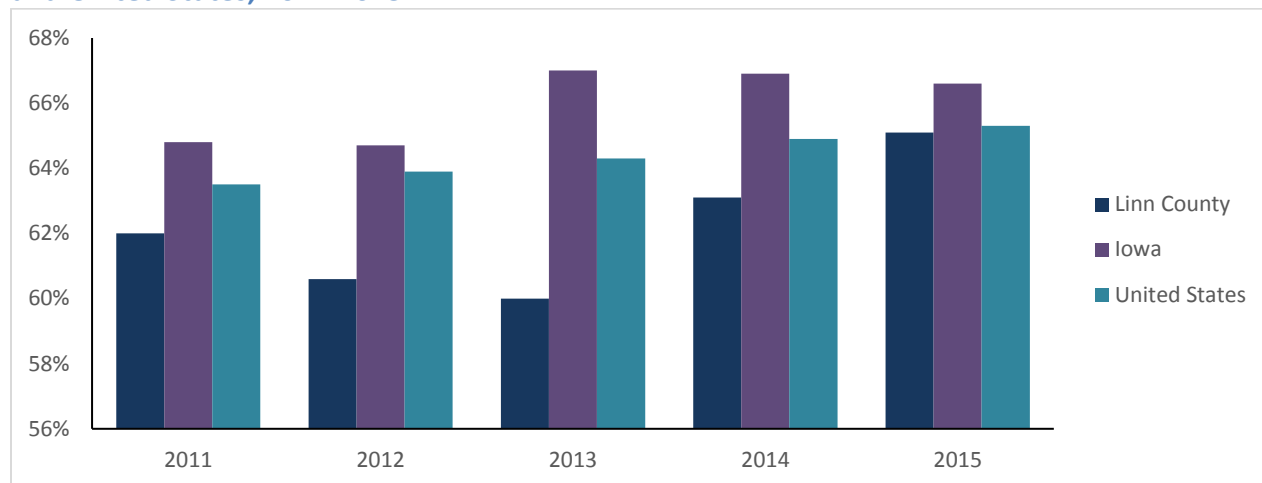
Trends

In 2015, 65.1% of adults in Linn County reported being overweight or obese, an increase of nearly 3.1% since 2012 (Figure 4.2). The increase in the percent of adults who are either overweight or obese in Iowa and the United State was nearly half of that in Linn County. Between 2012 and 2015, the percentage of adults who reported being obese or overweight increased by 1.8% in Iowa and 1.4% in the United States resulting in 66.6% and 65.3%, of all adults in Iowa and the United States reporting to be obese or overweight in 2015, respectively.

⁶ Obesity Trends Among U.S. Adults Between 1985 and 2010. *Centers for Disease Control and Prevention*. [Online] March 28, 2014. [Cited: June 25, 2014.] <http://www.cdc.gov/obesity/data/adult.html>

⁷ Overweight and Obesity. *Centers for Disease Control and Prevention*. [Online] January 11, 2013. [Cited: February 14, 2014.] <http://www.cdc.gov/obesity/data/facts.html>.

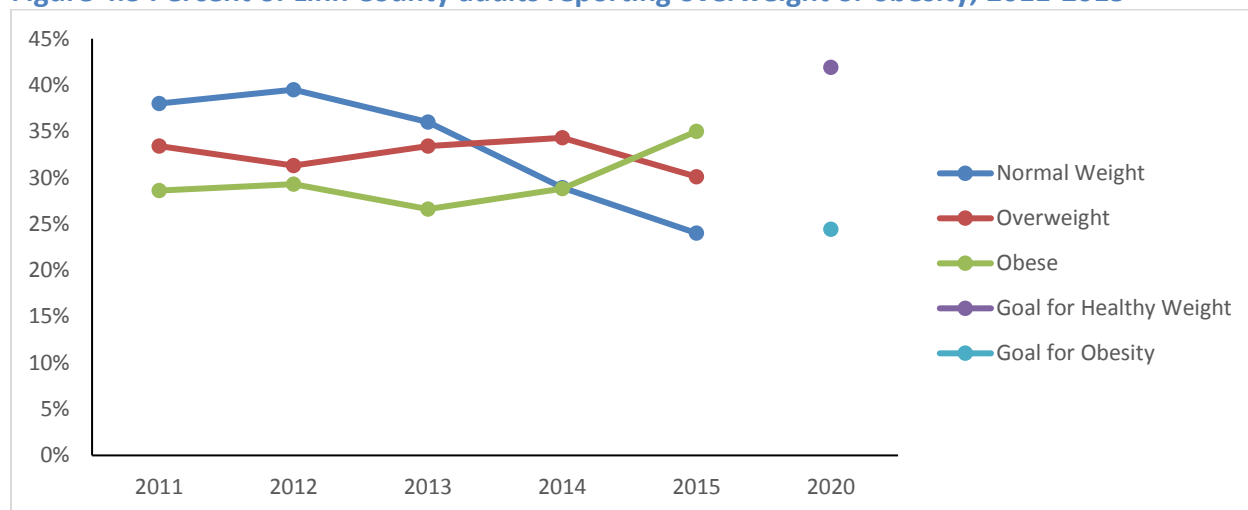
Figure 4.2 Percent of population 18 or older reporting overweight or obese, Linn County, Iowa and United States, 2011-2015



Source: Behavioral Risk Factor Surveillance System (BRFSS), 2011-2015

In 2015, the percentage of adults in Linn County who were identified as obese exceeded that of those who were overweight with 35% of adults found to be obese and 30.1% overweight. The total percent of the overweight and obese population has increased overtime from 62% to 65.1% of adults designated as either overweight or obese between 2011 and 2015. Likewise, during this time the percent of adults who are neither overweight nor obese (normal weight or underweight) has decreased from 38% in 2011 to 24% in 2015 (Figure 4.3).

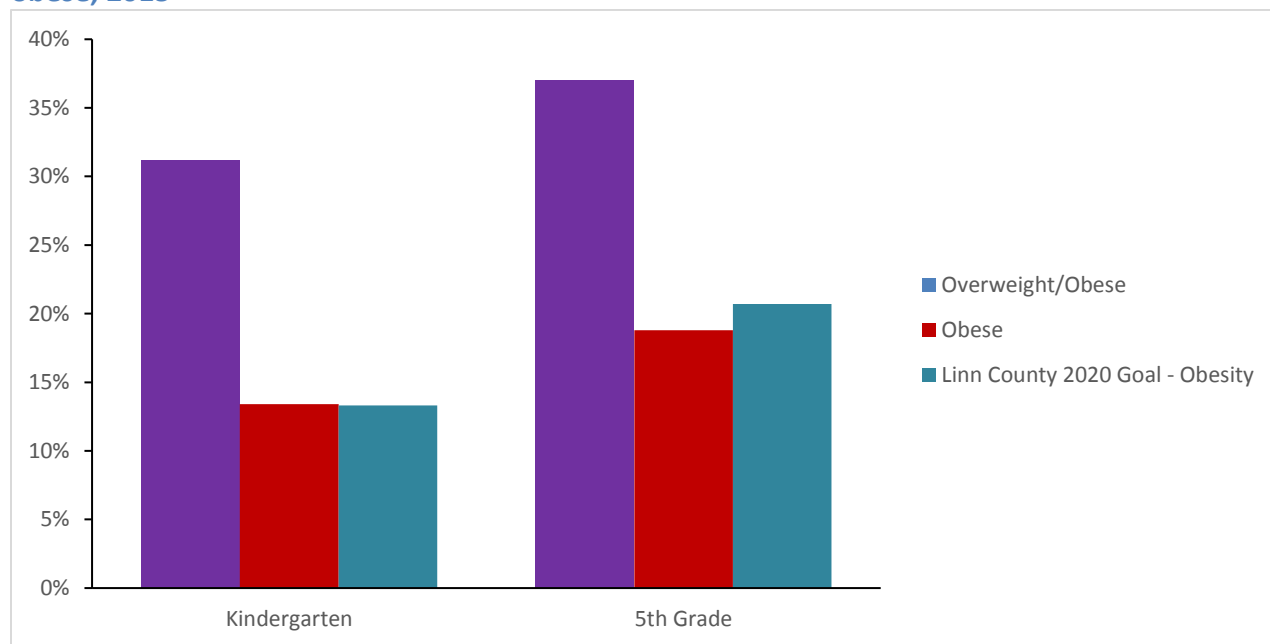
Figure 4.3 Percent of Linn County adults reporting overweight or obesity, 2011-2015



Source: Behavioral Risk Factor Surveillance System (BRFSS), 2011-2015

In 2015, 17.8% of kindergartners were overweight and 13.4% were obese for a total of 31.2% of kindergartners that were overweight or obese. Among fifth graders, 18.2% were overweight and 18.8% were obese for a total of 37% of fifth graders who were deemed overweight or obese (Figure 4.4). According to the CDC, approximately 17% of children and adolescents nationwide aged 2 to 19 years are obese.⁸

Figure 4.4 Percent of Linn County kindergartners and 5th graders that are overweight or obese, 2015



Source: Cedar Rapids School District, 2016

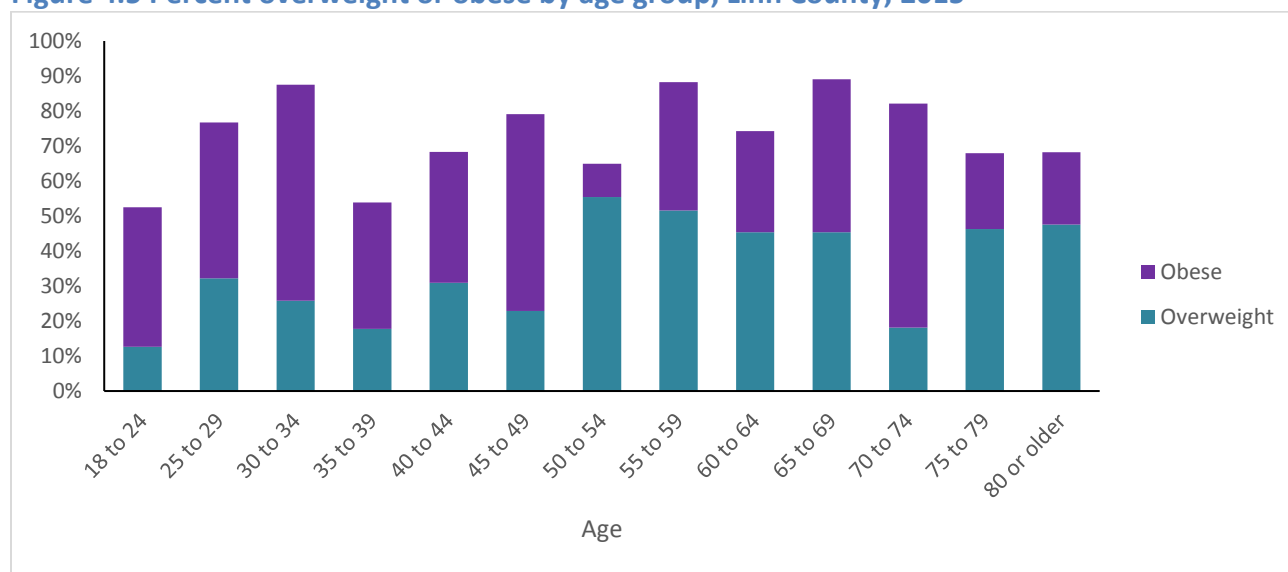
⁸ Overweight and Obesity. *Centers for Disease Control and Prevention*. [Online] January 11, 2013. [Cited: February 14, 2014.] <http://www.cdc.gov/obesity/data/facts.html>.

Disparities

Age and Sex

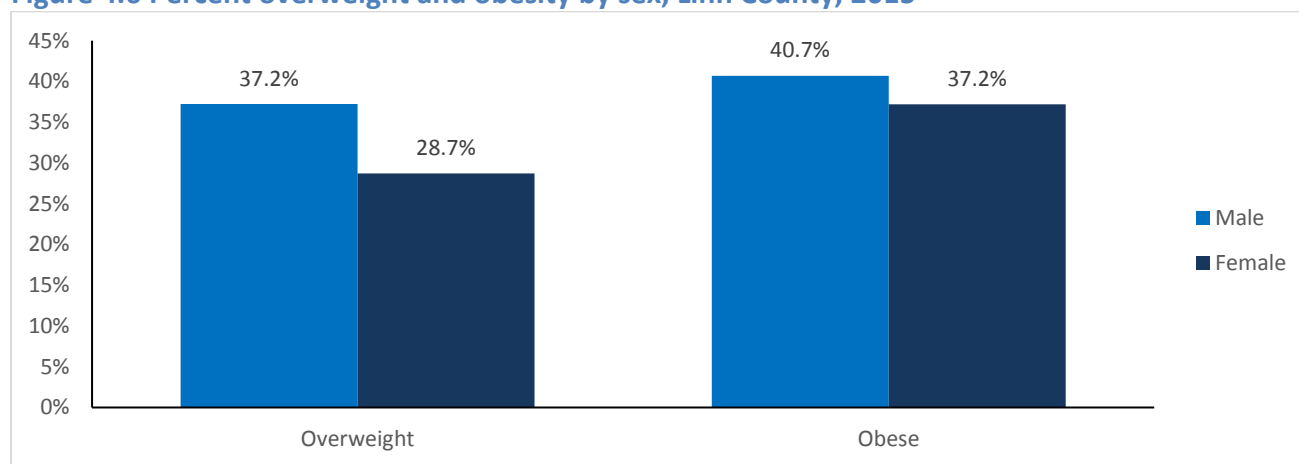
Distribution of advanced body mass index (overweight or obese) among Linn County adults differs slightly depending on age and sex. The greatest proportion of overweight or obese adults in 2015 was among 65 to 69 year olds, with 89.1% of this population designated as either overweight or obese (Figure 4.5). However, significant fluctuation is noted across the different age groups. Males were more likely to report being overweight or obese as compared to their female counterparts, with 77.9% of males and 65.9% of females identifying themselves as either overweight or obese (Figure 4.6).

Figure 4.5 Percent overweight or obese by age group, Linn County, 2015



Source: Behavioral Risk Factor Surveillance System, 2015

Figure 4.6 Percent overweight and obesity by sex, Linn County, 2015

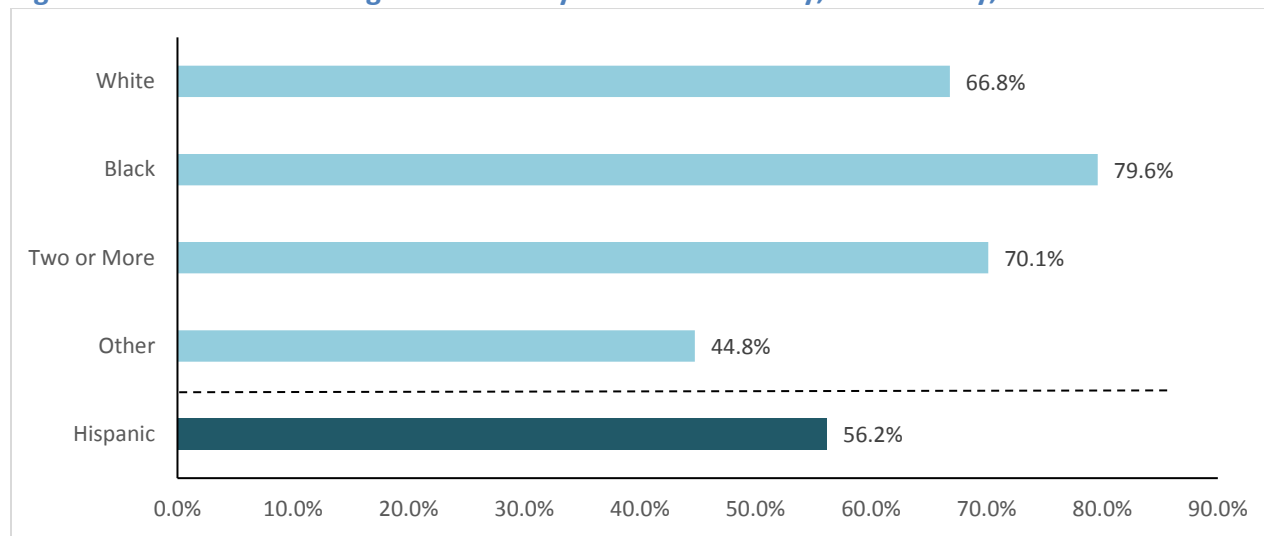


Source: Behavioral Risk Factor Surveillance System, 2015

Race and Ethnicity

Between 2011 and 2015, two-thirds of white adults in Linn County reported being overweight or obese, while nearly 80% of Black respondents and 70% of those who belonging to two or more races reported being overweight or obese. Fewer Hispanics than non-Hispanics reported being overweight or obese during this period, with 56.2% of Hispanics compared to 65.3% of non-Hispanics reporting to be overweight or obese (Figure 4.7).

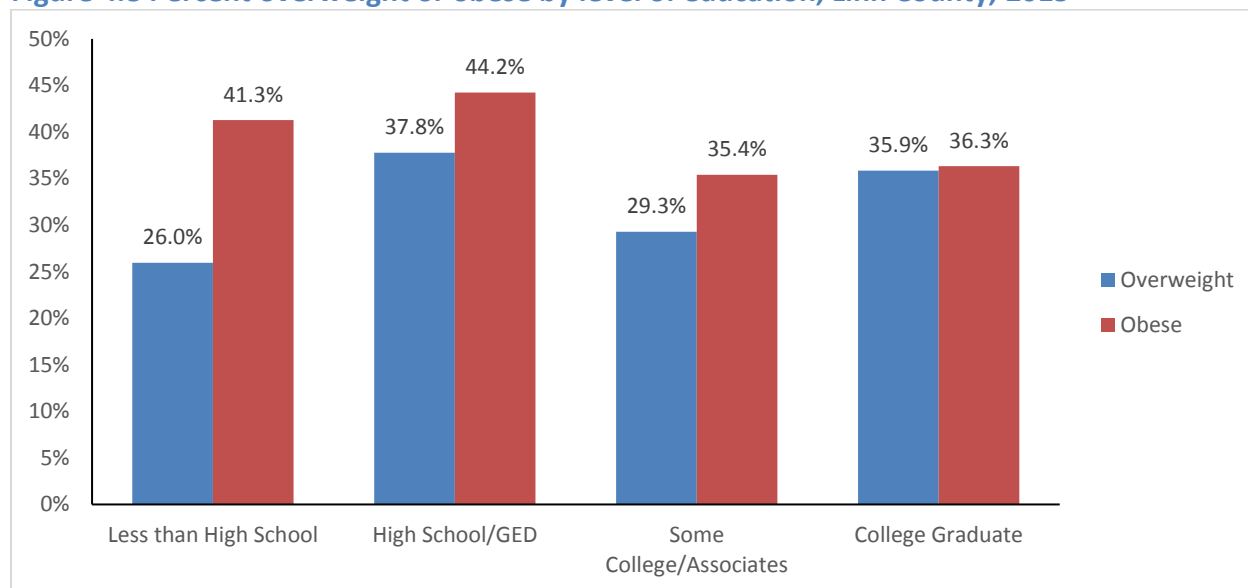
Figure 4.7 Percent overweight or obese by race and ethnicity, Linn County, 2011-2015



Source: Behavioral Risk Factor Surveillance System, 2015

Education

Based on the results of the 2015 Behavioral Risk Factor Surveillance Survey, educational attainment did not significantly predict overweight/obesity status. However, individuals who receive less than an Associate's degree appear to be at a greater risk for being obese, comparatively. Approximately, 44% of individuals with a high school degree or less report being obese compared to 36% of individuals with a college degree (Figure 4.8).

Figure 4.8 Percent overweight or obese by level of education, Linn County, 2015

Source: Behavioral Risk Factor Surveillance System, 2015

Risk Factors

Obesity results from an energy imbalance in the body, which involves eating too many calories and not burning calories through physical activity. Many factors contribute to a person's risk for obesity, including behavior, culture, environment, genetics, metabolism and socioeconomic status.⁹ In Linn County, males, persons between 35 and 74 years of age, whites, and non-Hispanics and those with lower overall educational attainment reported more obesity.

However, it is important to mention that obesity is self-reported, so these risk factors may differ if persons surveyed are not accurate in their reports. There is growing evidence of the impact of the built environment on obesity – persons are at risk if their community, home, school, child care, health care and workplace settings are barriers to eating healthy or getting enough physical activity.⁹

⁹ Overweight and Obesity. *Centers for Disease Control and Prevention*. [Online] January 11, 2013. [Cited: February 14, 2014.] <http://www.cdc.gov/obesity/data/facts.html>.

Cancer

All Sites

Linn County 2020 Goal:

Reduce the overall cancer mortality rate to 150.5 deaths per 100,000 population, a 10% reduction from the 3-year average of 167.3 in 2008-2010.

Trends

In 2014, there were 1,101 new cases of cancer in Linn County, which translated into an age-adjusted cancer incidence rate of 452.8 per 100,000 population. From 2010 to 2015, the five most common cancers were female breast, prostate, lung and bronchus, colon and rectum and melanoma of the skin. While prostate had the highest incidence rate, lung and bronchus had the highest death rate (Table 4.1).

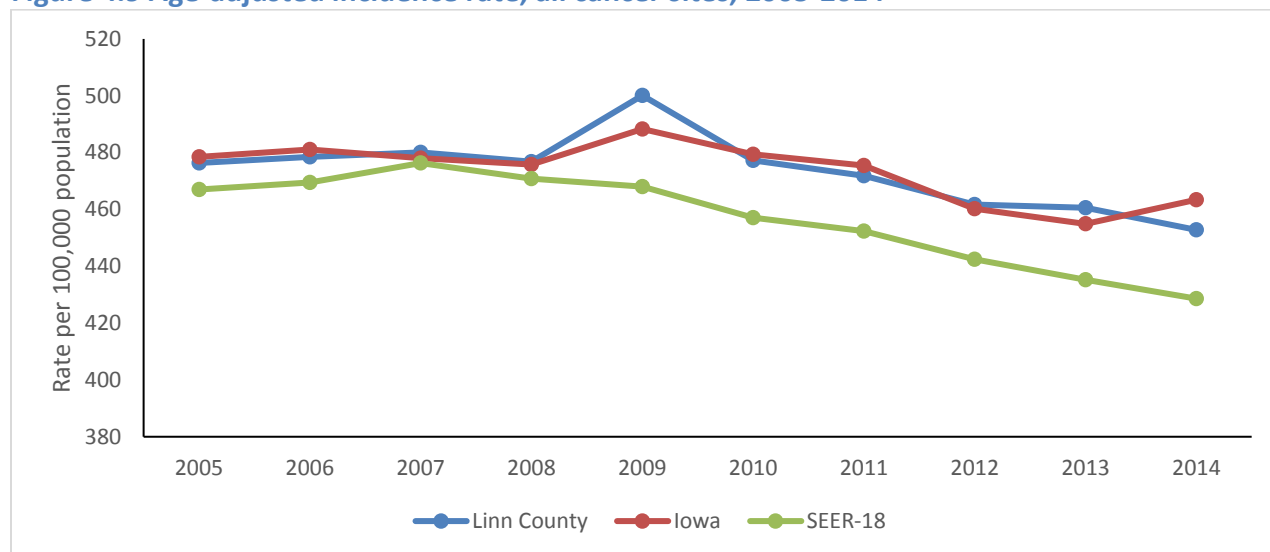
Table 4.1 Top 5 Cancer Types in Linn County, 2010 - 2014

Site	Age-adjusted Incidence Rate per 100,000 population	Total Cases	Age-adjusted Death Rate per 100,000 population	Total Deaths
Female Breast	126.8	785	16.7	112
Prostate	90.3	516	16.3	78
Lung and Bronchus	66.5	787	47.0	553
Colon and Rectum	39.1	456	13.8	166
Melanoma - Skin	26.2	300	1.7	21

Source: Surveillance, Epidemiology, and End Results (SEER) Program

The state of Iowa is one of 18 areas that participate in the Surveillance, Epidemiology and End Results (SEER) program. SEER establishes a cancer registry in Iowa where Iowa's cancer data can be easily compared to the cancer data of the other SEER locations. The other SEER locations are San Francisco, Connecticut, Detroit, Hawaii, New Mexico, Seattle, Utah, Atlanta, San Jose-Monterey, Los Angeles, Alaska Native Registry, Greater and Rural Georgia, Greater California, Kentucky, Louisiana, and New Jersey. From 2005 to 2014, the age-adjusted incidence rates for cancer of all sites in Linn County decreased slightly from 476.4 to 452.8 cases per 100,000, a difference of 23.6 fewer cases per 100,000 population. The age-adjusted incidence rate in 2014 for Linn County is slightly less than Iowa as a whole, but higher than the rate for all SEER locations combined (Figure 4.9).

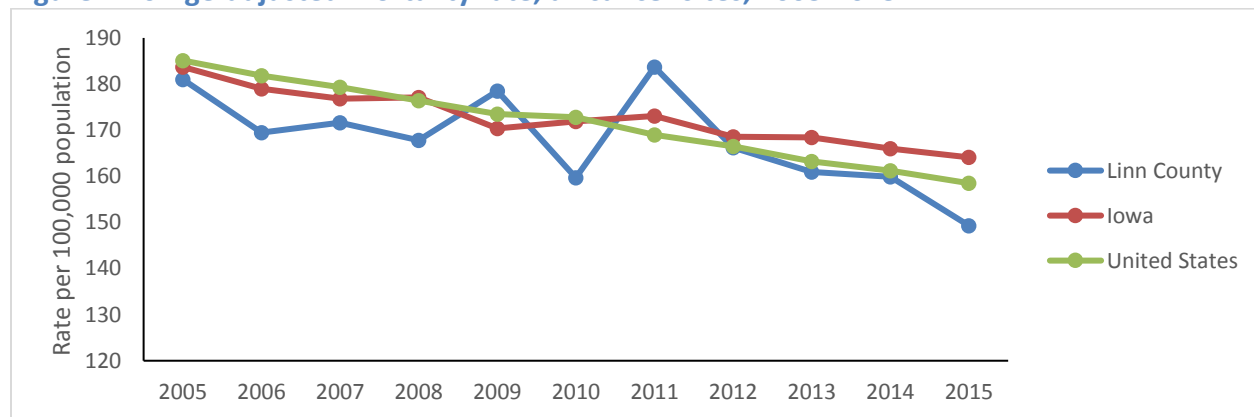
Figure 4.9 Age-adjusted incidence rate, all cancer sites, 2005-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

From 2005 to 2015, the age-adjusted cancer mortality rate in Linn County decreased from 181.0 to 149.3 per 100,000 population, a difference of 31.7 fewer deaths per 100,000 population (Figure 4.10). While the rate has consistently declined over the past 10 years, the decline is not statistically significant. The overall mortality rate for all cancer sites in Linn County falls below that of the state of Iowa, United States, and the Linn County 2020 goal of 150.5 cases per 100,000.

Figure 4.10 Age-adjusted mortality rate, all cancer sites, 2005-2015

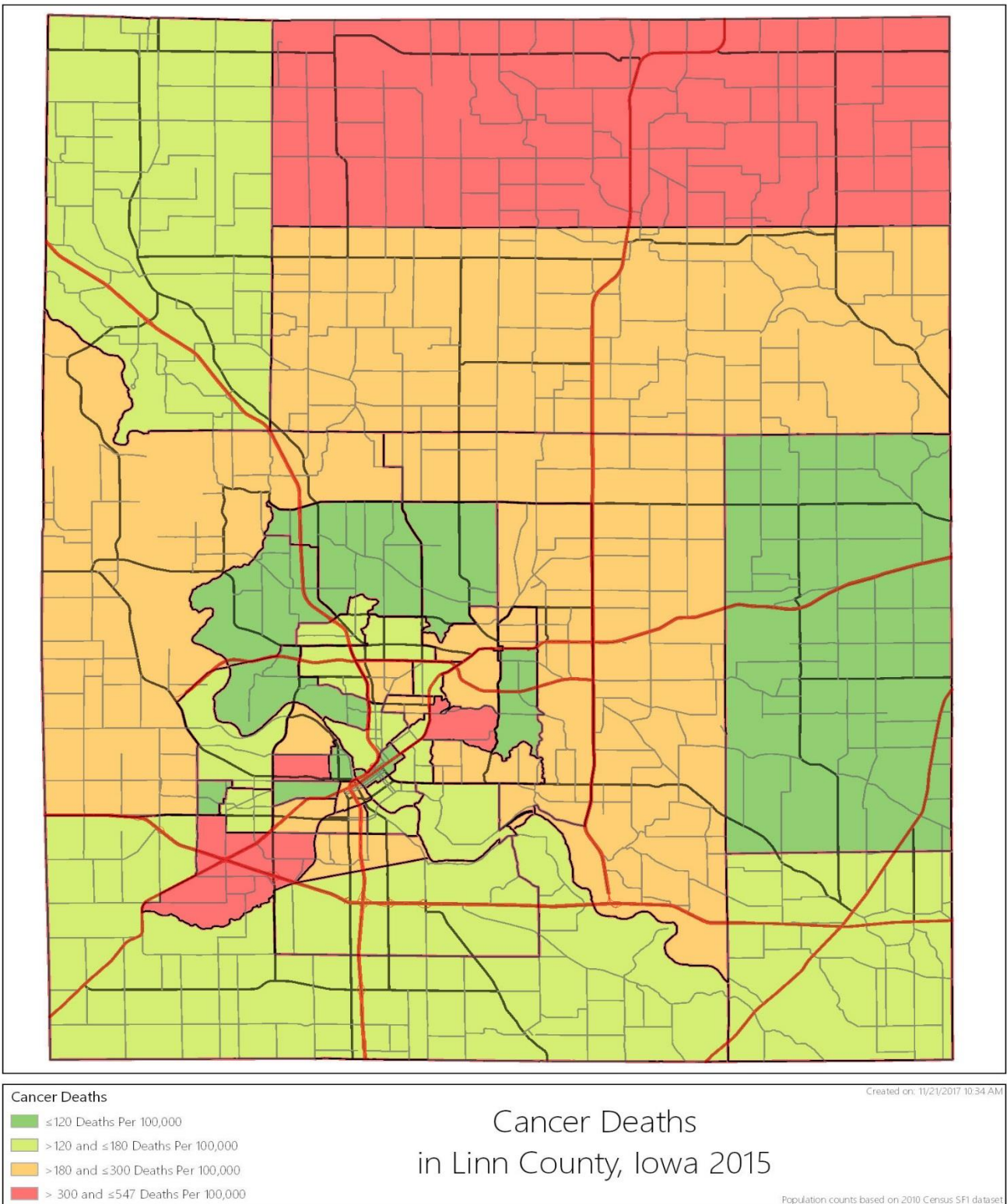


Source: CDC WONDER

Geographical Variation

Figure 4.11 displays cancer deaths by census tract in Linn County. Areas shaded red and orange had more deaths, areas shaded green had fewer deaths.

Figure 4.11 Linn County cancer deaths by census tract, 2015



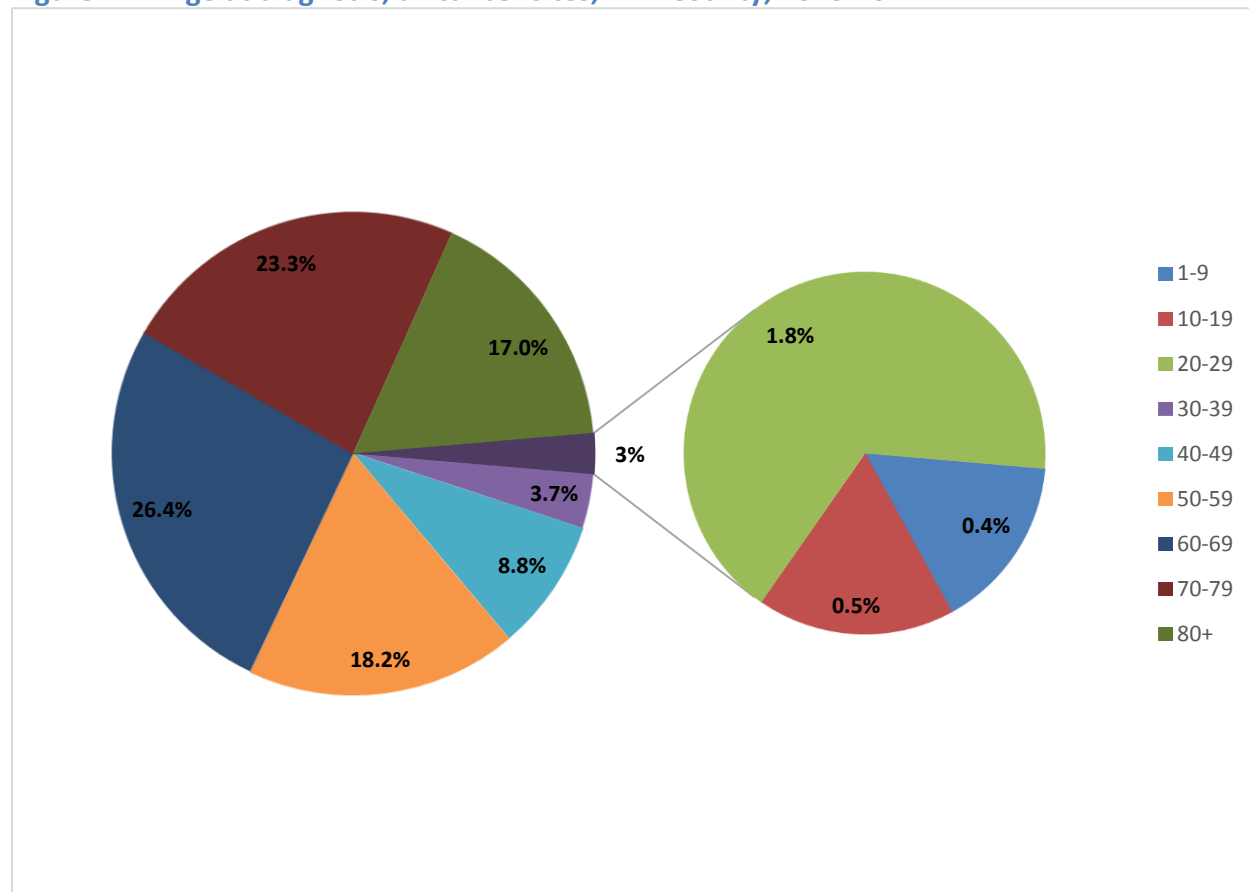
Source: Vital Records, Bureau of Health Statistics, Iowa Department of Public Health

Disparities

Age

Among all cancer patients diagnosed in Linn County between 2010 and 2014, 2.7% were less than 30 years old when diagnosed (Figure 4.12), 33.4% were less than 60 years old and 59.8% were under 70 years old at the time of diagnosis.

Figure 4.12 Age at diagnosis, all cancer sites, Linn County, 2010-2014

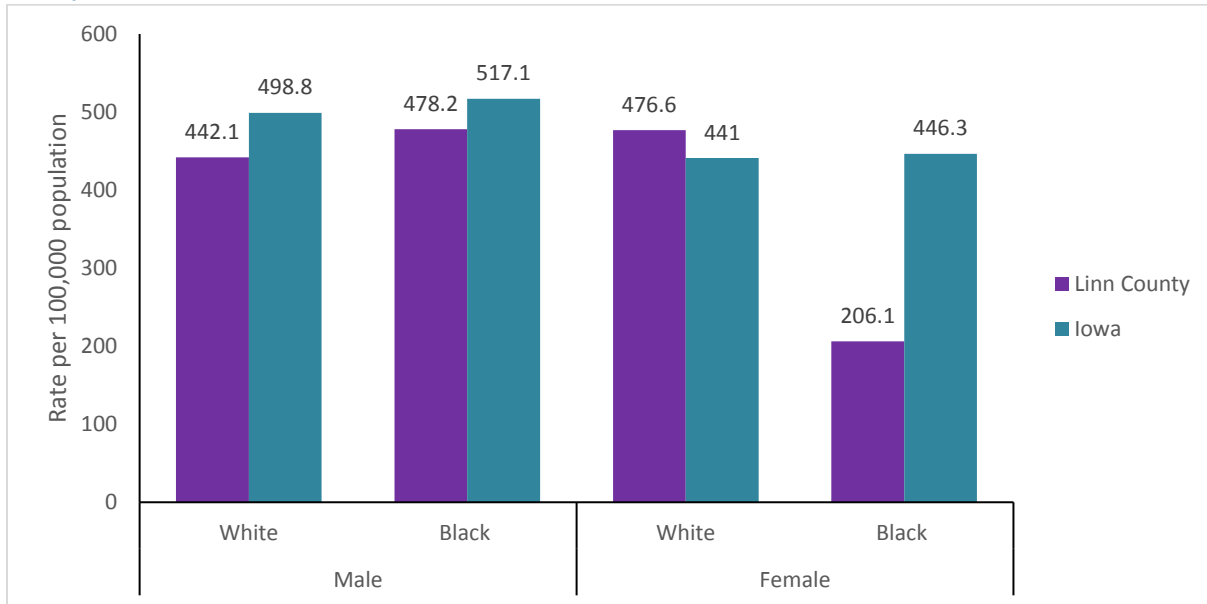


Source: Surveillance, Epidemiology, and End Results (SEER) Program

Sex and Race

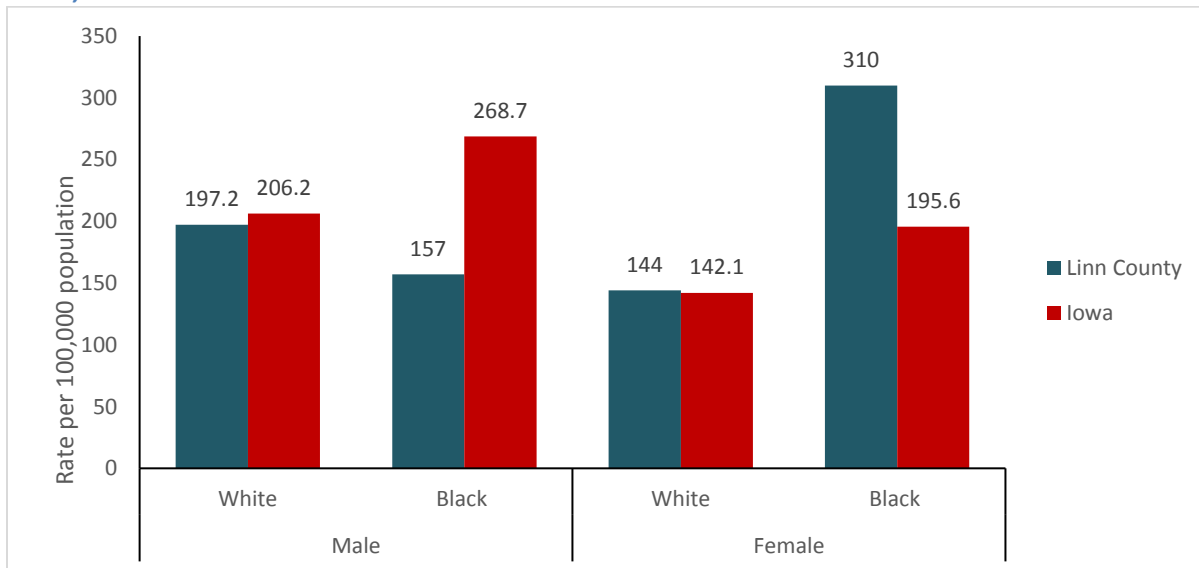
In Linn County, males have a higher incidence rate than females for all-site cancer and blacks have higher incidence rates than whites. When compared to the state of Iowa, Linn County tends to demonstrate a lower incidence of all site cancers among black males and females as well as white males. However, all site cancer incidence among white females slightly exceeds that of white females in the state of Iowa (Figure 4.13). Black females in Linn County account for the most significant mortality rate for all-site cancer as compared to white males and females and black males (Figure 4.14).

Figure 4.13 Age-adjusted incidence rates by sex and race, all cancer sites, Linn County and Iowa, 2010-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

Figure 4.14 Age-adjusted mortality rates by race and sex, all cancer sites, Linn County and Iowa, 2010-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

Breast

Linn County 2020 Goal

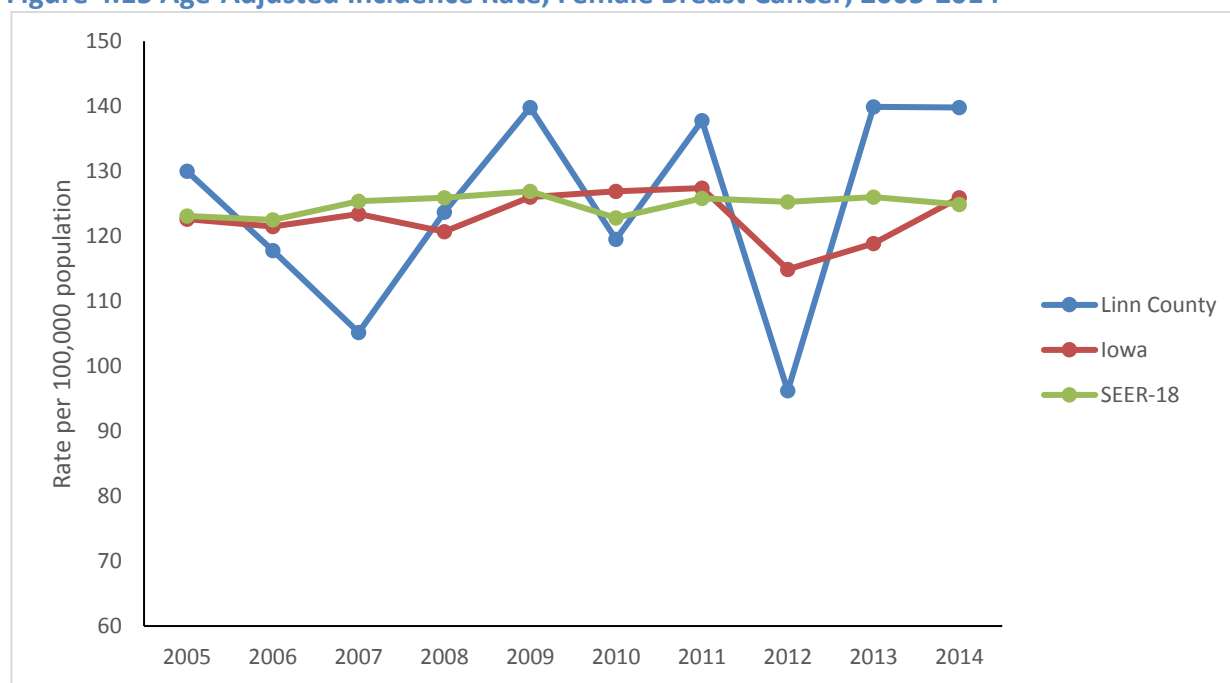
Reduce the mortality rate related to female breast cancer to 18.1 deaths per 100,000 population, a 10% reduction from the mortality rate in 2010 of 20.1 per 100,000 population.

Increase the proportion of women who receive a breast cancer screening based on the most recent guidelines to 89.1%, a 10% increase from 81% in 2010.

Trends

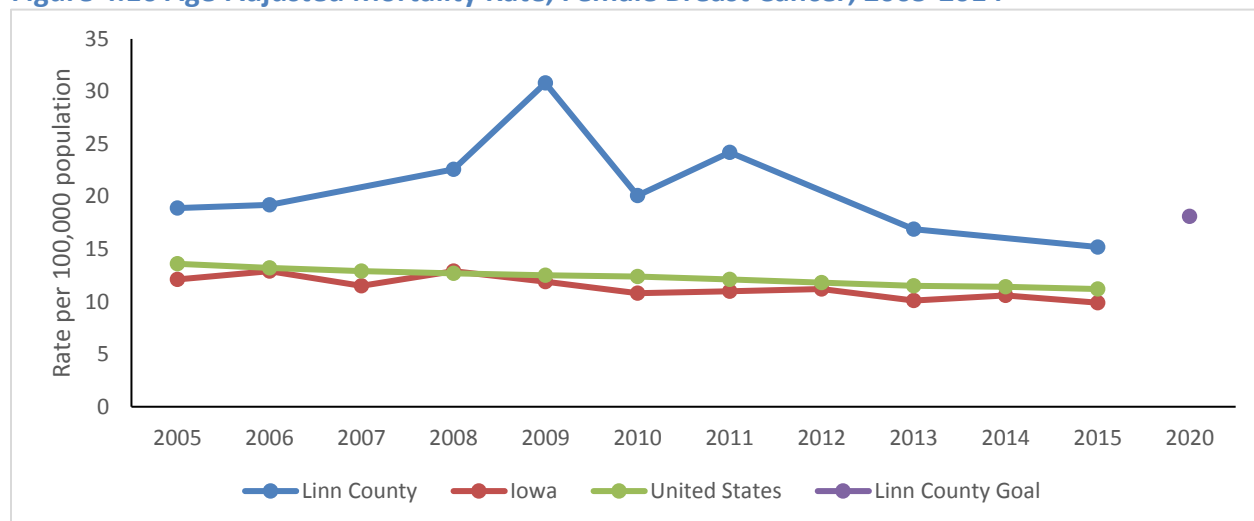
In 2014, the age-adjusted incidence rate for female breast cancer was 139.8 per 100,000. This rate exceeds that of the state of Iowa and the 18 SEER registries (Figure 4.15). While the age-adjusted mortality rate for breast cancer among females in Linn County has been variable, the mortality rate is on a downward trend. Overtime, the mortality rate for female breast cancer has decreased from a high of 30.8 deaths per 100,000 population in 2009 to a low of 15.2 deaths per 100,000 population in 2015 (Figure 4.16).

Figure 4.15 Age-Adjusted Incidence Rate, Female Breast Cancer, 2005-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

Figure 4.16 Age-Adjusted Mortality Rate, Female Breast Cancer, 2005-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

*Frequencies below 20 were suppressed when calculating Age-Adjusted Rates

Disparities

Sex

Although breast cancer primarily affects women, there are a few cases of breast cancer in males in Linn County. The age-adjusted breast cancer incidence between 2000 and 2014 among females was 128.1 per 100,000, while the incidence among males was 1.2 per 100,000 population. The age-adjusted mortality rate among females during this period was 19.4, and among males is zero per 100,000 population (Figure 4.17). While breast cancer incidence among females is 6.6 times greater than mortality, the incidence among men is less than twice the mortality rate, meaning that a greater proportion of men that are diagnosed with breast cancer will die from the disease. The earlier breast cancer is detected, the greater the survival rate. Males do not undergo regular screening for breast cancer, and are more likely to be diagnosed at a more advanced stage of disease.¹⁰

¹⁰ National Cancer Institute at the National Institutes of Health. General Information about Male Breast Cancer. [Online] April 17, 2014. [Cited May 12, 2014]. <http://www.cancer.gov/cancertopics/pdq/treatment/malebreast/patient>

Figure 4.17 Incidence and Mortality of Breast Cancer among Males and Females, Linn County 2000-2014

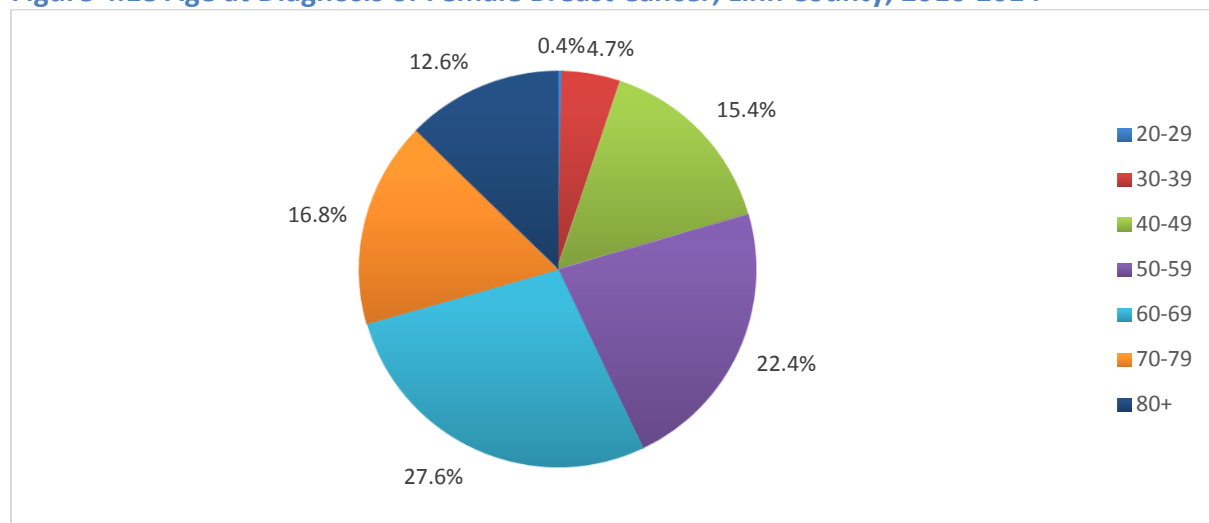


Source: Surveillance, Epidemiology, and End Results (SEER) Program

Age

The risk of breast cancer increases with age. Of all female breast cancer patients, 95% were aged 40 years or older, 79% were aged 50 years or older, 57% were aged 60 years or older, and 29% were aged 70 years or older at time of diagnosis (Figure 4.18).

Figure 4.18 Age at Diagnosis of Female Breast Cancer, Linn County, 2010-2014

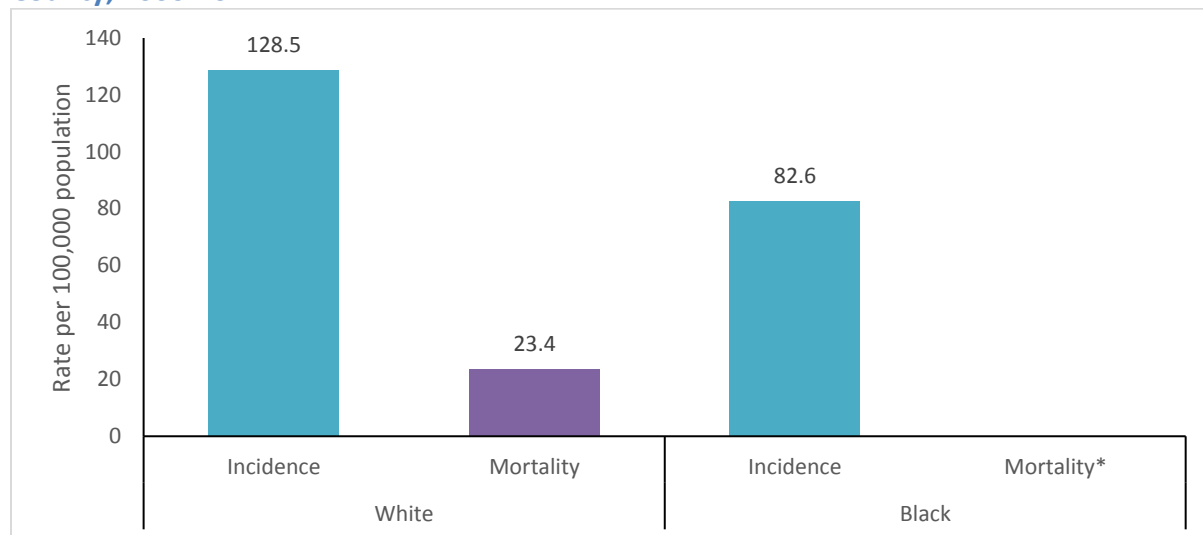


Source: Surveillance, Epidemiology, and End Results (SEER) Program

Race

In Linn County, age-adjusted incidence rates for breast cancer are higher for white females compared to black females; however, mortality rates are higher among black females than white females (Figure 4.19).

Figure 4.19 Age-adjusted female breast cancer incidence and mortality rates by race, Linn County, 2000-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

* Counts are too few for a stable age-adjusted rate

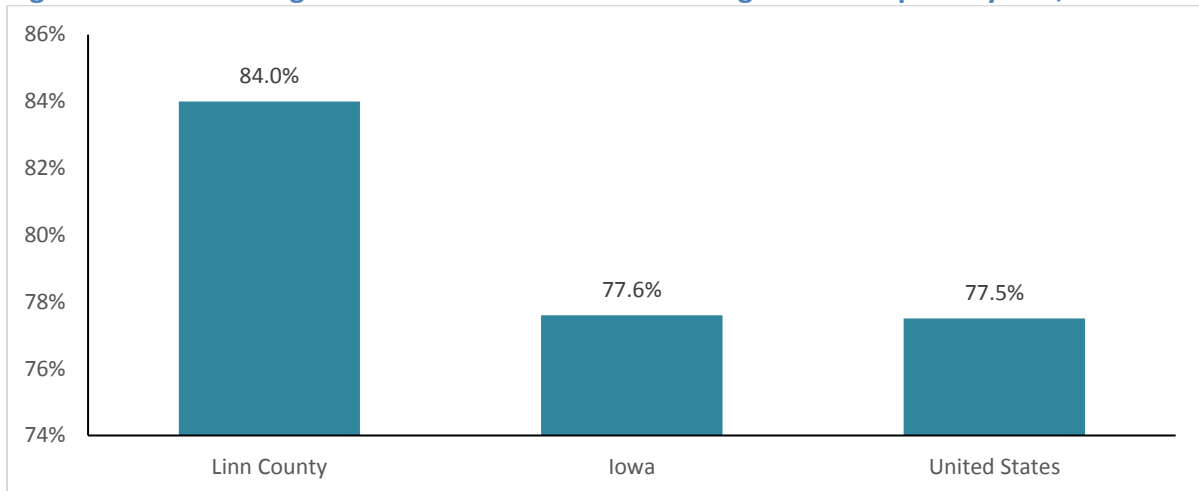
Risk Factors

- Reproductive Risk Factors: younger age at first menstrual period, starting menopause at later age, being older at the birth of your first child, never giving birth, not breastfeeding, and long-term use of hormone replacement therapy.
- Other Risk Factors: age, personal history of breast cancer or breast disease, family history of breast cancer, radiation therapy to breast/chest, dense breasts by mammogram, overweight, having changes in genes BRCA1 or BRCA2, drinking alcohol (>1 per day), and not getting regular exercise.

Health Interventions

The U.S. Preventative Services Task Force recommends screening mammography for breast cancer every two years for women aged 50 to 74 years. Having regular mammograms can lower the risk of dying from breast cancer.¹¹ In 2016, 84% of women living in Linn County aged 50 to 74 years reported meeting this screening recommendation (Figure 4.20).

Figure 4.20 Women age 50-74 who have had a mammogram in the past 2 years, 2016



Source: BRFSS

¹¹ Centers for Disease Control and Prevention. Breast Cancer: What screening tests are there? [Online] October 31, 2013. [Cited July 7, 2014]. http://www.cdc.gov/cancer/breast/basic_info/screening.htm

Cervical

Linn County 2020 Goals

Reduce the cervical cancer mortality rate to 1.5 deaths per 100,000 population, a 10% reduction from the 5-year average of 1.7 in 2006-2010.

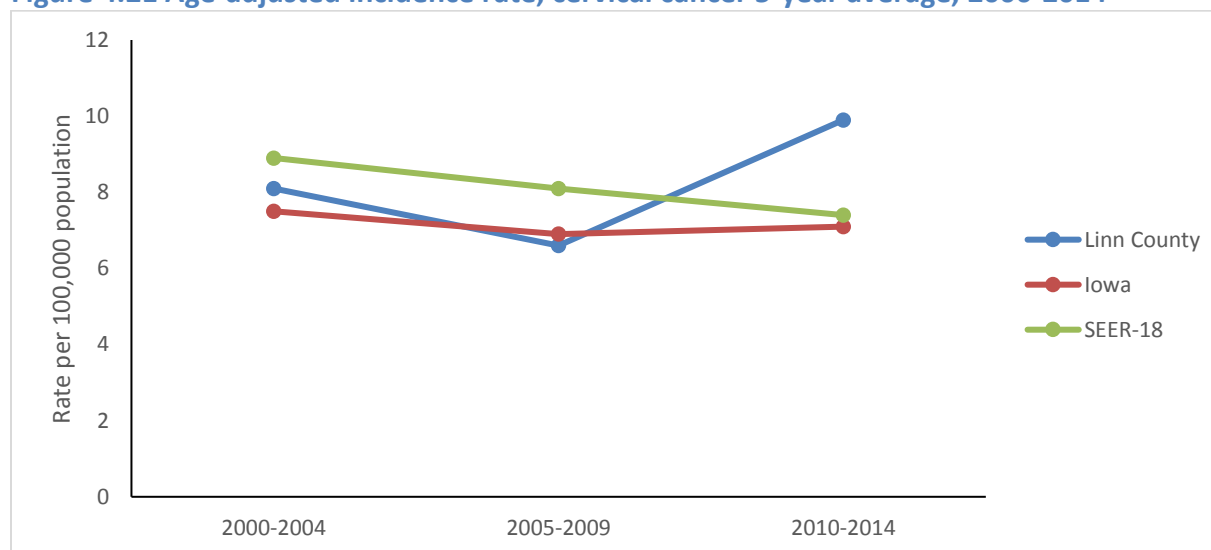
Increase the proportion of women who receive a cervical cancer screening based on the most recent guidelines to 93.6%, a 10% increase from 85.1% in 2010.

Increase the percent of females 13 to 15 years of age who have received three doses of human papillomavirus (HPV) vaccine to 80%.

Trends

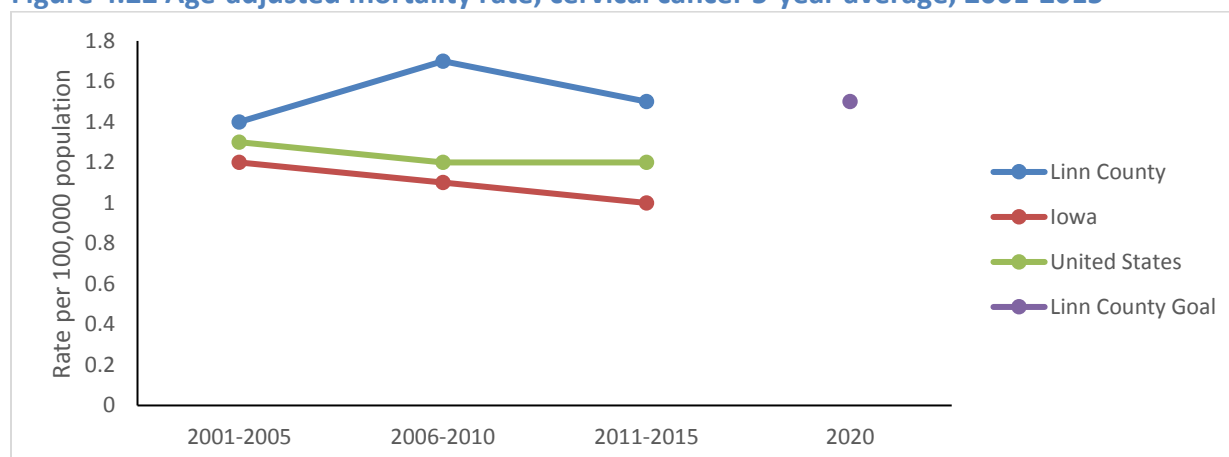
Due to small numbers of cervical cancer, trends presented are 5-year averages. In Linn County, the age-adjusted incidence of cervical cancer increased by 3.3 cases per 100,000 population between 2005-2009 and 2010-2014, increasing from 6.6 to 9.9 cases of cervical cancer per 100,000 population between these periods (Figure 4.21). While the rate is increasing, the increase was not statistically significant. Incidence of cervical cancer exceeds that of Iowa and the SEER-18 registries, which are both on a downward trend. The age-adjusted mortality rate for cervical cancer has remained stable overtime in Linn County, Iowa, and the United States fluctuating by 0.1 deaths per 100,000 population for each location over the study period (Figure 4.22).

Figure 4.21 Age-adjusted incidence rate, cervical cancer 5-year average, 2000-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

Figure 4.22 Age-adjusted mortality rate, cervical cancer 5-year average, 2001-2015



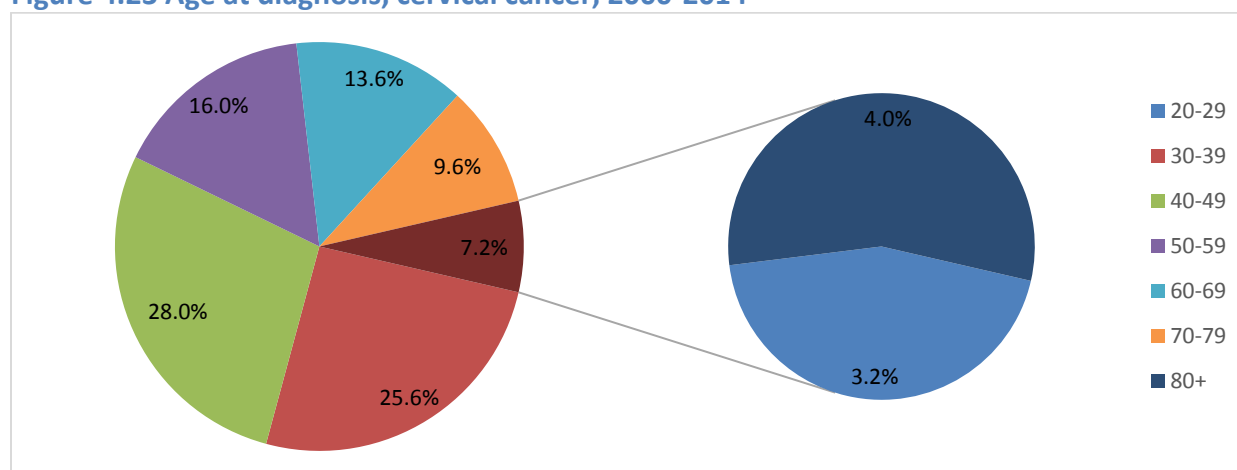
Source: Surveillance, Epidemiology, and End Results (SEER) Program

Disparities

Age

When compared to other cancer types, cervical cancer affects females earlier in life. Of all cervical cancer diagnoses from 2000 to 2014, 28.8% were among women under the age of 40 years old and 72.8% of all diagnoses were in women under 60 years of age (Figure 4.23).

Figure 4.23 Age at diagnosis, cervical cancer, 2000-2014

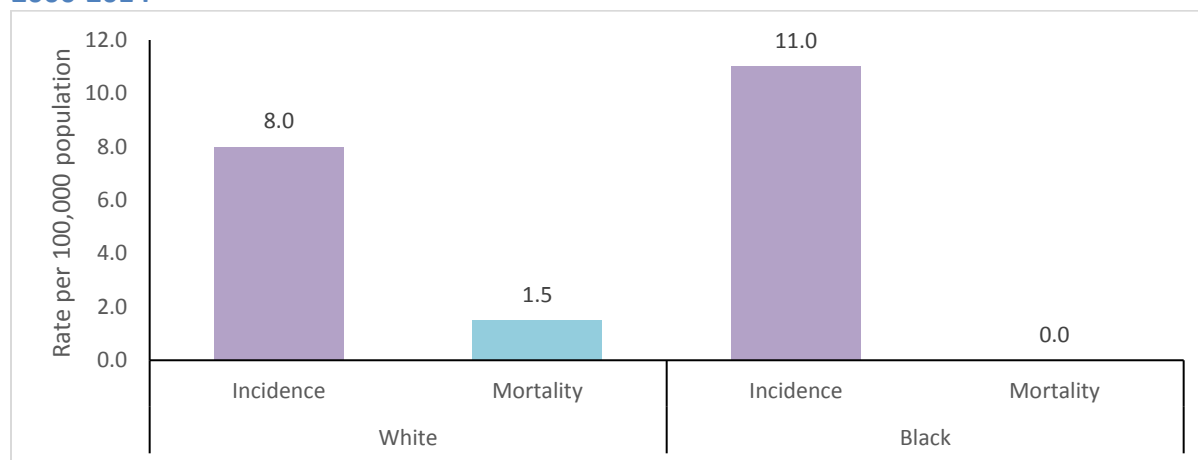


Source: Surveillance, Epidemiology, and End Results (SEER) Program

Race

Between 2000 and 2014, cervical cancer incidence was higher among black women compared to white women with an age-adjusted rate of 11.0 cases per 100,000 compared to 8.0 per 100,000, respectively (Figure 4.24). However, the mortality rate among black women was zero per 100,000 population compared to 1.5 per 100,000 population.

Figure 4.24 Age-adjusted incidence and mortality cervical cancer rates by race, Linn County, 2000-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

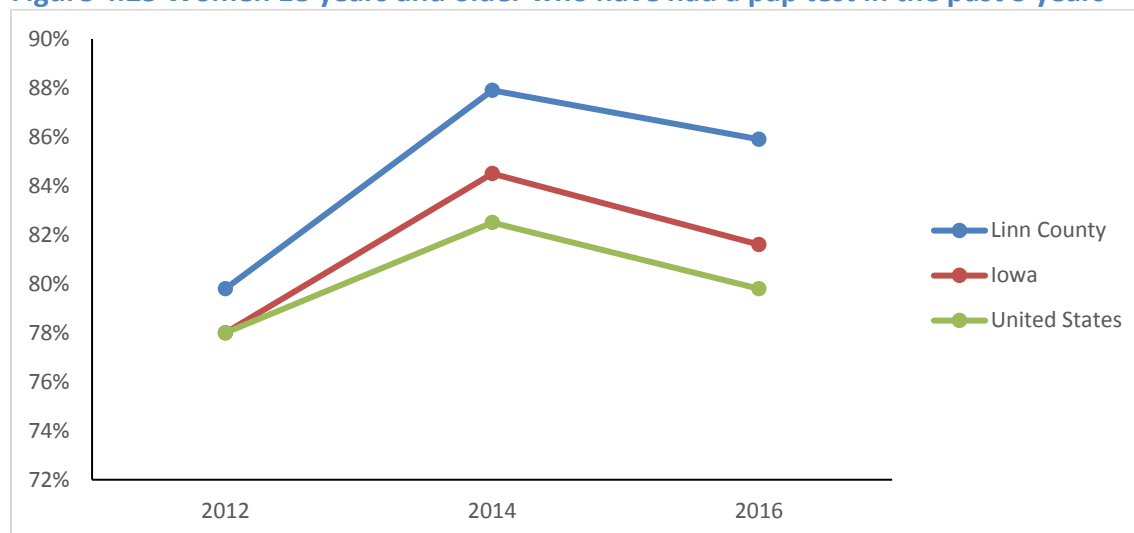
Risk and Factors

The most common sexually transmitted virus in the United States, human papillomavirus (HPV), is the primary cause of cervical cancer. Other factors that increase the risk of cervical cancer or increase the chances that a person will be exposed to HPV are smoking, HIV infection, a compromised immune system, using birth control pills for five or more years, having given birth to three or more children and having several sexual partners.

Health Interventions

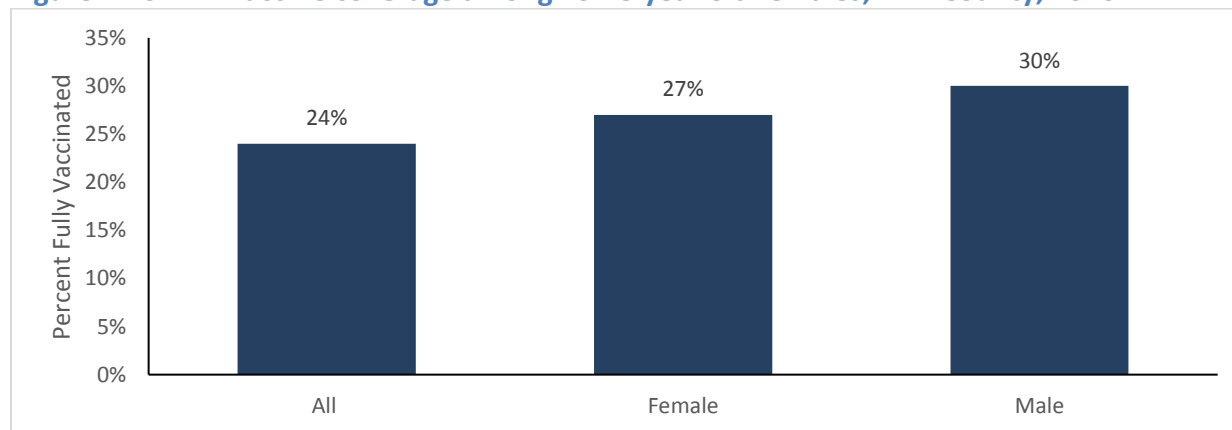
Cervical cancer may be detected early using two screening tests, the Pap test (or Pap smear) and the HPV test. A Pap smear is a screening test that assesses the cervix for precancerous cell changes. The HPV tests identify the presence of multiple strains of HPV in the body. It is recommended that women get a Pap test starting at age 21 and every 3 years thereafter until the age of 65.¹² There was a slight increase in women in Linn County who received a Pap test in the past 3 years. In 2016, 85.9% of women 21 years of age or older met this recommendation increased from 78.2% in 2014. Screening among women 18 years of age and older was similar in Linn County, Iowa, and the United States (Figure 4.25).

¹² U.S. Preventative Services Task Force. Screening for Cervical Cancer. U.S. Preventive Services Task Force. [Online] April 2012. [Cited: December 5 2013.] <http://www.uspreventiveservicestaskforce.org/uspstf/uspscerv.htm>.

Figure 4.25 Women 18 years and older who have had a pap test in the past 3 years

Source: BRFSS

In 2006, a vaccine was made available to prevent infection with some of the common strains of HPV associated with cervical cancer. The HPV vaccine is recommended for males and females 11 to 12 years old. It is also recommended for males up to 21 years and females up to 26 years old who have not had all of their shots in the 3-dose vaccine series. In 2016, only 24% of males and females 13-15 years old in Linn County had received three or more doses of HPV vaccine. During this time, there was a slightly higher percentage of males (30%) compared to females who received all three HPV vaccine doses (Figure 4.26).

Figure 4.26 HPV vaccine coverage among 13-15 year old females, Linn County, 2016

Source: Iowa Immunization Program, CDC

Colorectal

Linn County 2020 Goal

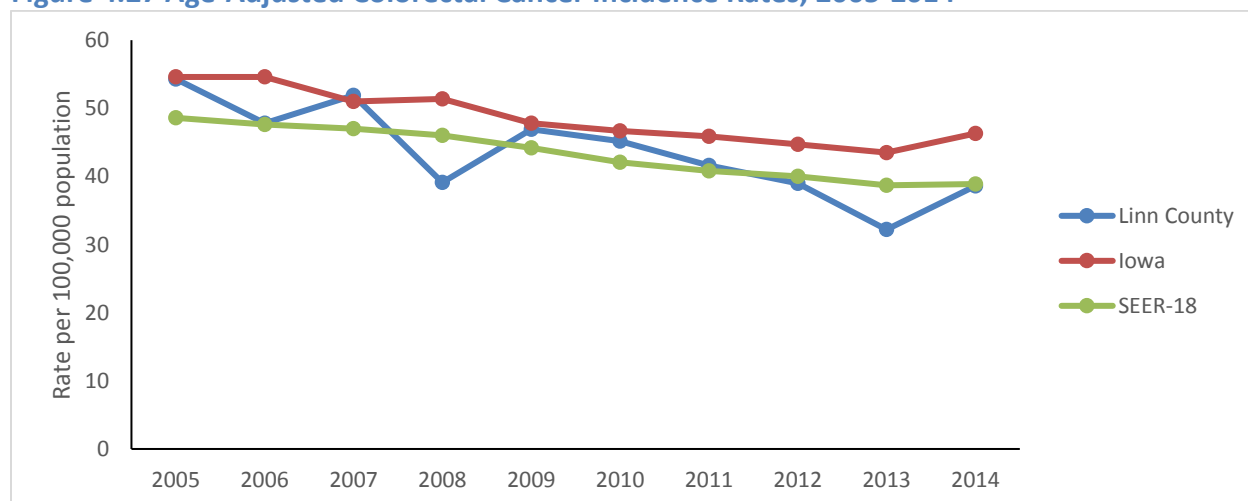
Reduce the colorectal mortality rate to 14.3 deaths per 100,000, a 15% reduction from the 3-year average of 15.9 per 100,000 in 2008-2010.

Increase the proportion of Linn County residents who receive a colorectal screening based on the most recent guidelines to 89.1%, a 35% improvement from 66.0% in 2010.

Trends

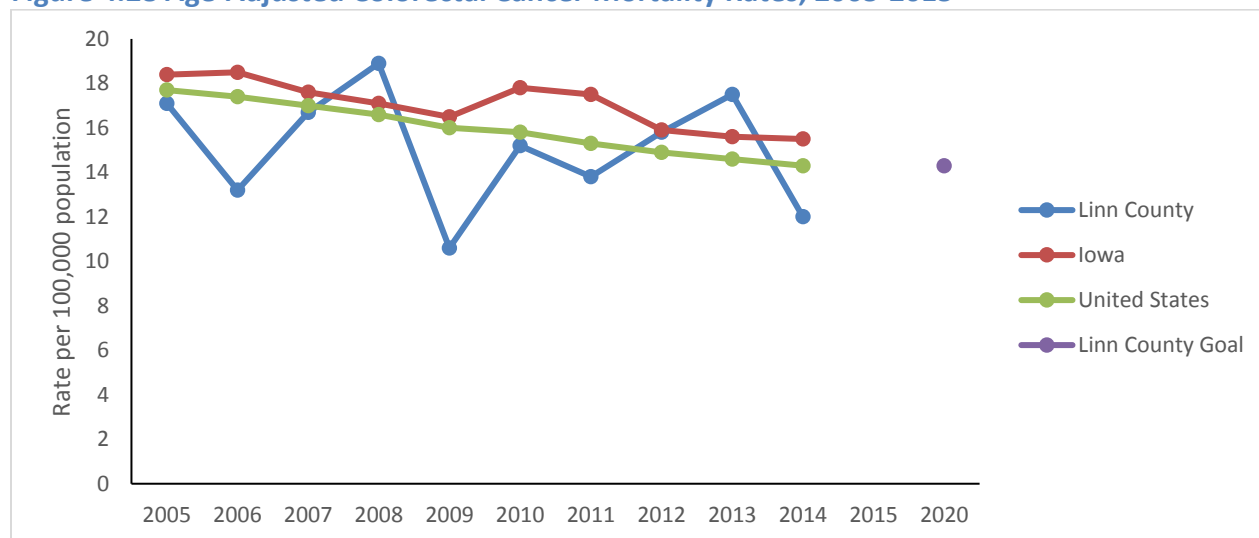
In 2014, the incidence of colorectal cancer in Linn County was 38.6 cases per 100,000 population, down from a rate of 54.3 per 100,000 in 2005 (Figure 4.27). Overtime, the incidence of colorectal cancer has generally fallen below that of the state of Iowa. The mortality rate for Linn County has fluctuated overtime with a high of 18.9 per 100,000 in 2007 and low of 11.6 per 100,000 in 2014 (Figure 4.28). However, the change in mortality rate between years is not statistically significant. Compared to Iowa, United States, and the Linn County 2020 goal, the mortality rate for colorectal cancer in Linn County remains lower.

Figure 4.27 Age-Adjusted Colorectal Cancer Incidence Rates, 2005-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

Figure 4.28 Age-Adjusted Colorectal Cancer Mortality Rates, 2005-2015



Source: CDC WONDER

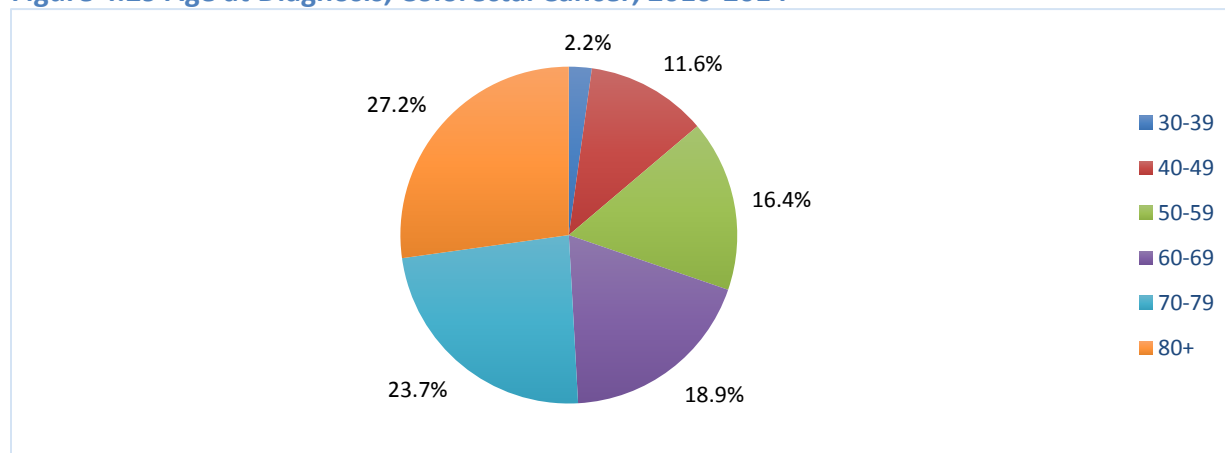
Disparities

Age

Like other cancers, colorectal cancer risk increases with age. From 2010-2014, over half of all colorectal cancers (51%) were diagnosed in people aged 70 years or older (

Figure 4.29). Approximately, 2% of cases were among individuals between the ages of 30 and 39 years, 11.6% were between 40 and 49, 16.4% were between 50 and 59 years, and 19% between 60 and 69 years old.

Figure 4.29 Age at Diagnosis, Colorectal Cancer, 2010-2014

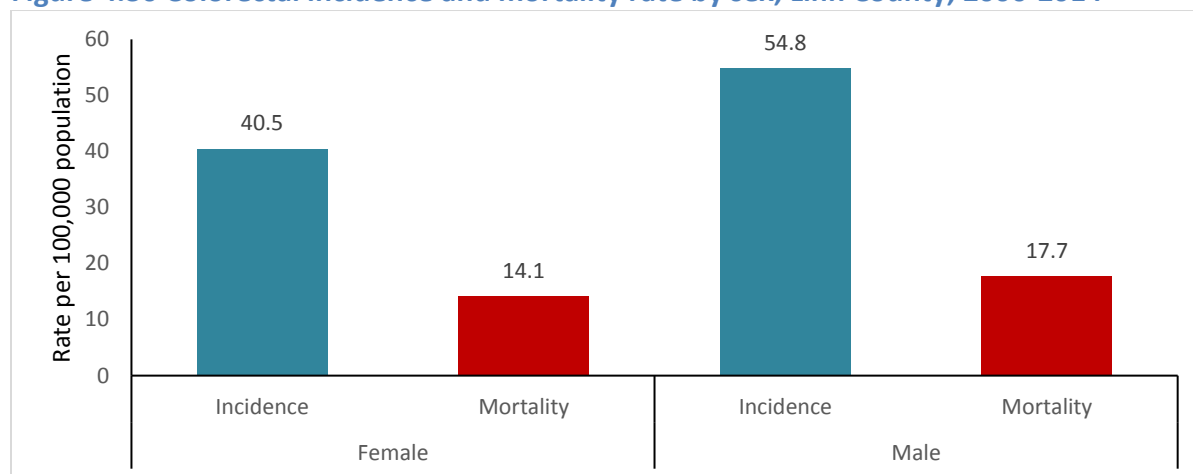


Source: Surveillance, Epidemiology, and End Results (SEER) Program

Sex

Colorectal cancer is more prevalent among males compared to their female counterparts. However, the mortality rate was similar across sexes. From 2000 to 2014, males in Linn County had a colorectal cancer incidence rate of 54.8 per 100,000 population compared to 40.5 per 100,000 among females. The mortality rate was 17.7 deaths per 100,000 population among males and 14.1 deaths per 100,000 among females (Figure 4.30).

Figure 4.30 Colorectal incidence and mortality rate by sex, Linn County, 2000-2014



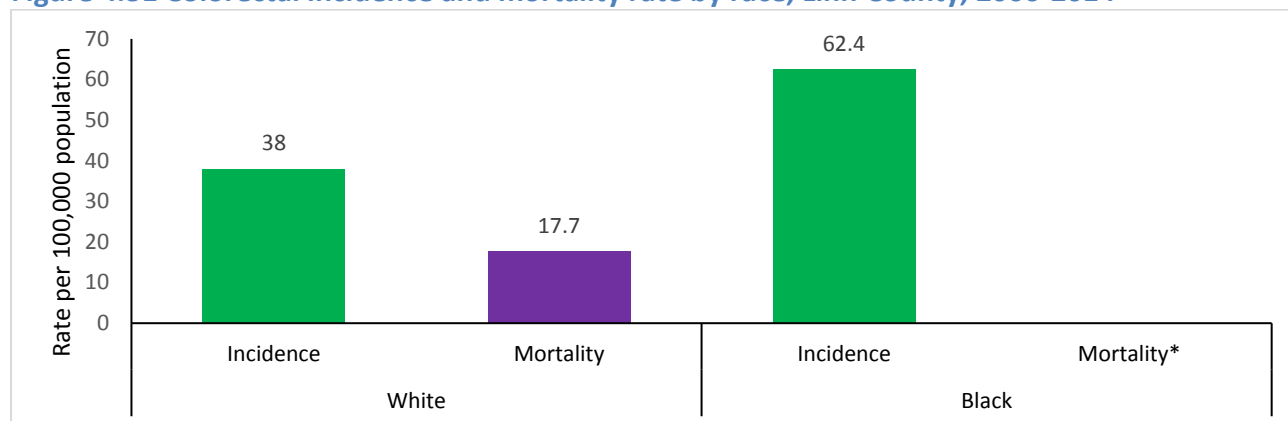
Source: Surveillance, Epidemiology, and End Results (SEER) Program

Race

In Linn County, incidence rates for colorectal cancer are higher for blacks than for whites. However, the counts for colorectal cancer among blacks are too low to calculate a stable age-adjusted mortality rate, but for whites the rate is 17.7 deaths per 100,000 between 2000 and 2014 (Figure 4.31). Nationally, mortality rates among blacks are higher than any other race.¹³

¹³Centers for Disease Control and Prevention. Colorectal Cancer Rates by Race and Ethnicity. Centers for Disease Control and Prevention. [Online] August 12, 2013. [Cited: February 14, 2014.] <http://www.cdc.gov/cancer/colorectal/statistics/race.htm>.

Figure 4.31 Colorectal incidence and mortality rate by race, Linn County, 2000-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

*Counts are too low to calculate a stable age-adjusted mortality rate

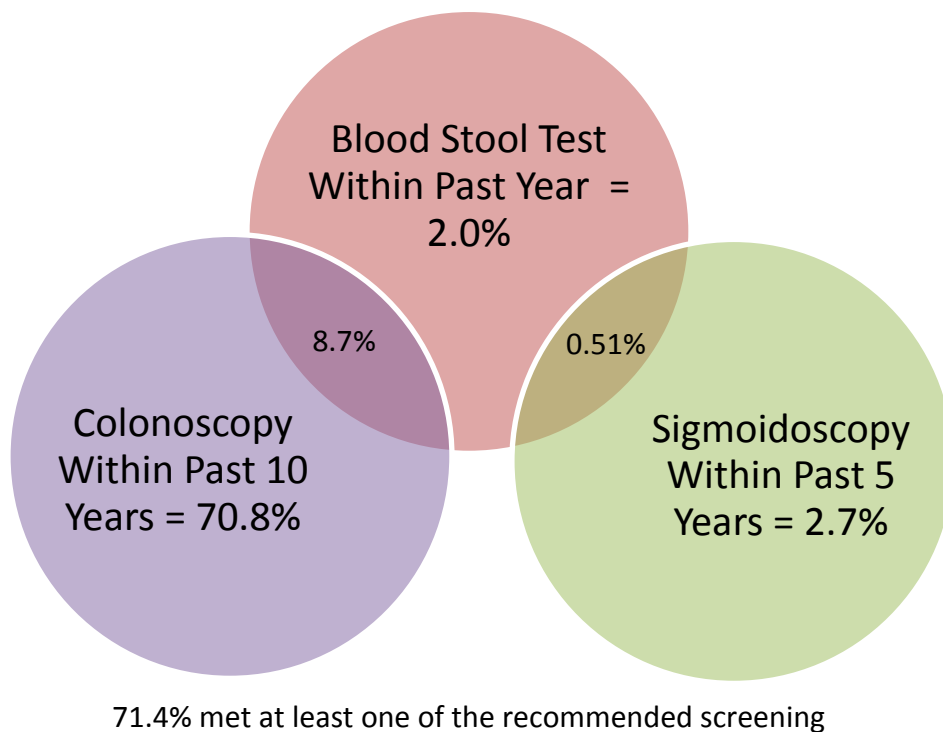
Risk and Protective Factors

The risk of colorectal cancer increases with age, especially age 50 years and older. As previously indicated, African American/black race is also a risk factor. Other risks include family history of colorectal cancer or personal history of colorectal cancer, colon polyps or inflammatory bowel disease, inherited genetic mutations, diabetes, physical inactivity, diet high in fat or low in fruits/vegetables, obesity, smoking, and heavy alcohol use.

Health Interventions

The U.S. Preventive Services Task Force recommends screening for colorectal cancer using fecal occult blood or fecal immunochemical testing (blood stool test) annually, sigmoidoscopy every five years or colonoscopy every 10 years beginning at age 50. In Linn County, 71.4% of the population age 50 years or older met at least one of the screening recommendations. Nearly three-fourths of the population who met the screening recommendations received a colonoscopy within the past 10 years (Figure 4.32).

Figure 4.32 Persons ≥50 years old receiving recommended cancer screening, Linn County, 2016



Source: BRFSS

Lung

Linn County 2020 Goal

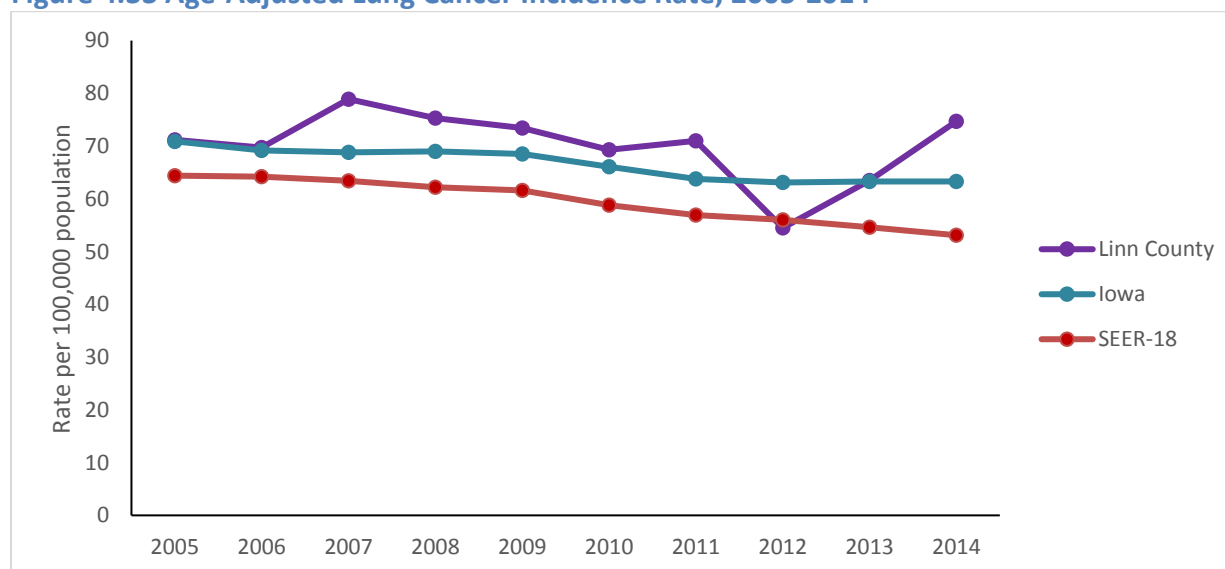
Reduce the mortality rate related to lung cancer to 43.6 deaths per 100,000, a 10% reduction from the 3-year average of 48.5 per 100,000 in 2008-2010.

Trends

In Linn County, the incidence rate for lung cancer was 74.7 cases per 100,000 in 2014 (Figure 4.33). Rate of lung cancer incidence in Linn County between 2005 and 2014 has generally been stable with the exception of a drop of 16.5 cases per 100,000 between 2011 and 2012.

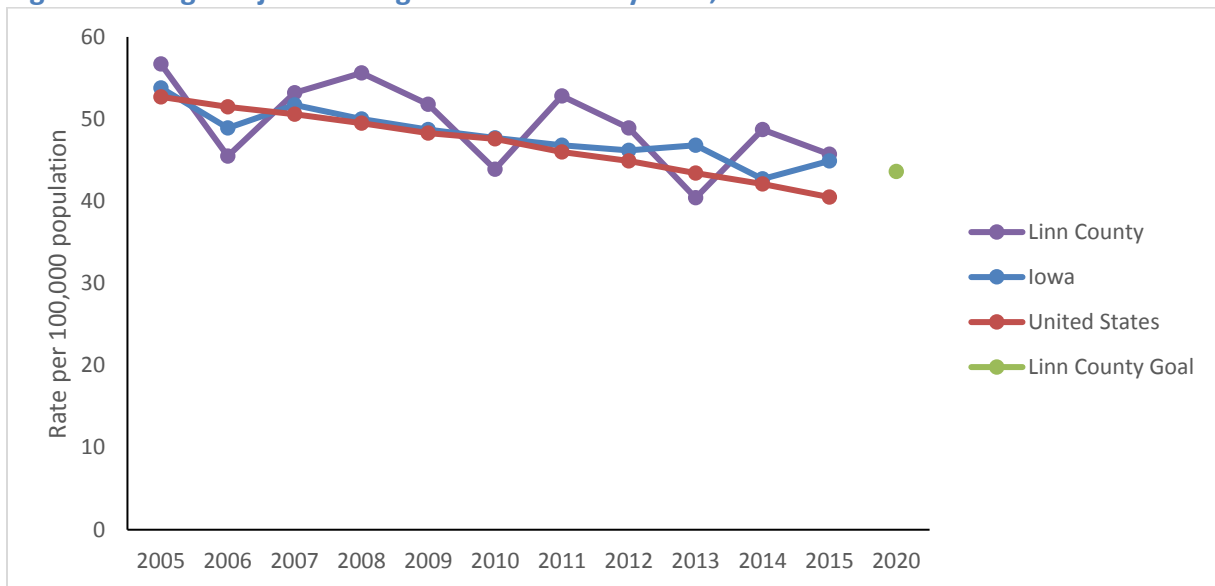
Followed by a statistically significant increase between 2012 and 2014, increasing from 54.5 to 74.7 cases per 100,000 population. Linn County exceeds the incidence of both Iowa and the SEER-18 registries. In the same period, the mortality rate in Linn County has fluctuated, slightly exceeding that of Iowa and the United States (Figure 4.34). However, the mortality rates between the three geographic locations do not differ significantly.

Figure 4.33 Age-Adjusted Lung Cancer Incidence Rate, 2005-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

Figure 4.34 Age-Adjusted Lung Cancer Mortality Rate, 2005-2015



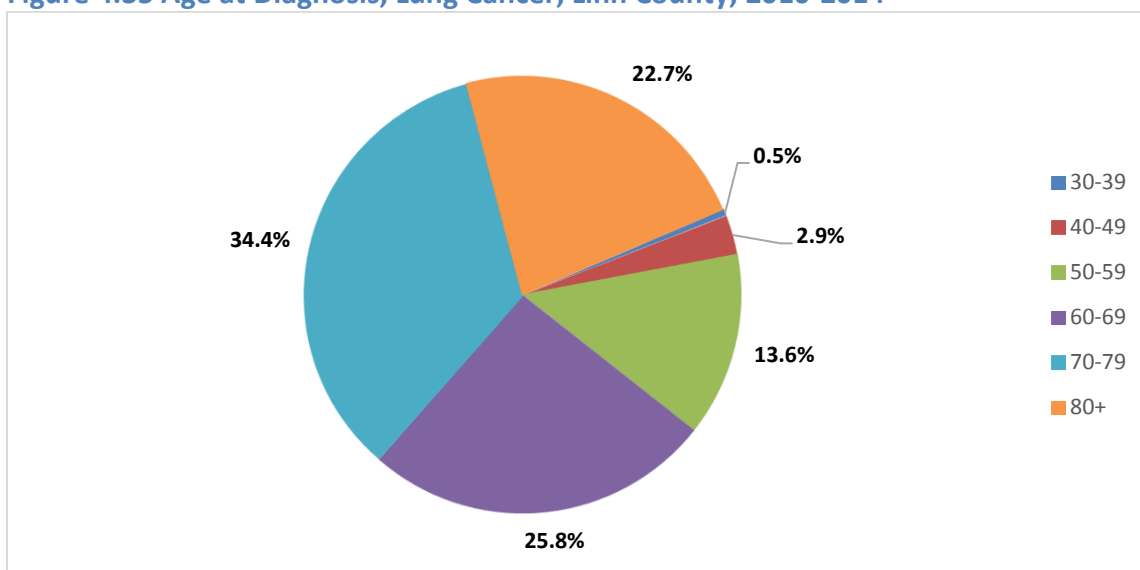
Source: CDC WONDER

Disparities

Age

Over half (57.1%) of all lung cancer diagnoses in Linn County were among people aged 70 years or older and another 25.8% were among people aged 60 years or older (Figure 4.35).

Figure 4.35 Age at Diagnosis, Lung Cancer, Linn County, 2010-2014

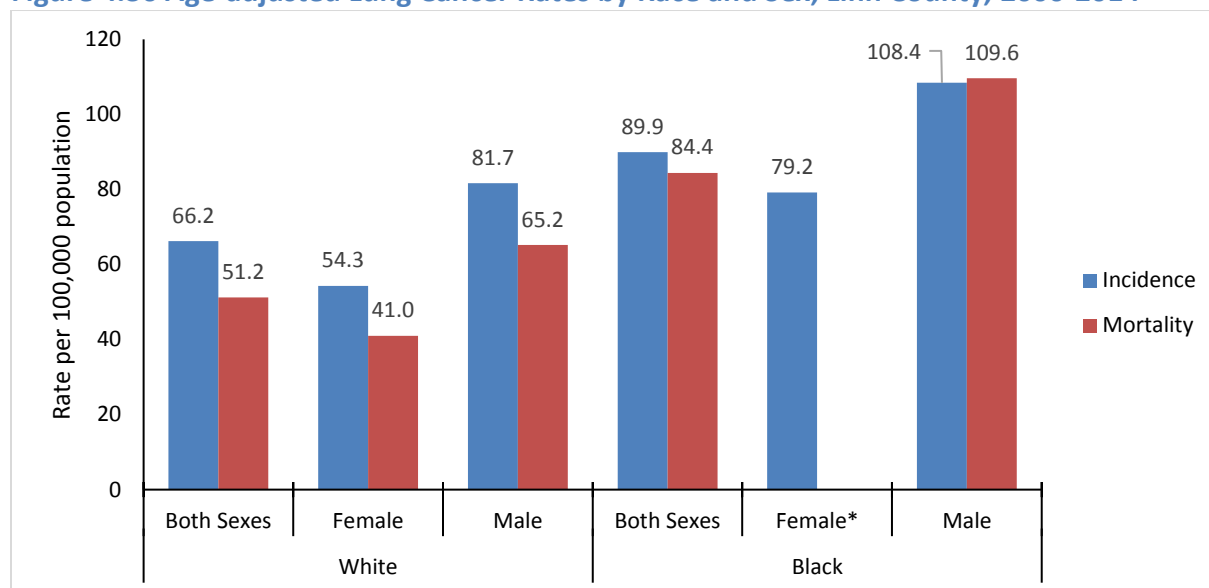


Source: Surveillance, Epidemiology, and End Results (SEER) Program

Sex and Race

In Linn County, black males have the highest incidence and death rates of lung cancer. Black males have an age-adjusted incidence rate of 108.4 cases per 100,000 population, while white females have the lowest rate, at 54.3 cases per 100,000 population. White females also have the lowest lung cancer death rate with 41.0 lung cancer deaths per 100,000 population (Figure 4.36).

Figure 4.36 Age-adjusted Lung Cancer Rates by Race and Sex, Linn County, 2000-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

*Counts are too low to calculate a stable age-adjusted mortality rate

Risk Factors

Risk factors for lung cancer include cigarette smoking, radon exposure, secondhand smoke, chronic inflammation of the lungs and environmental and occupational exposures. Nationally, smoking is the leading cause of lung cancer. Radon is the second leading cause of lung cancer overall and the leading cause of lung cancer among nonsmokers.¹⁴

¹⁴ Centers for Disease Control and Prevention. Lung Cancer. [Online] February 24, 2014. [Cited December 10 2013]. <http://www.cdc.gov/cancer/lung/>

Melanoma of the Skin

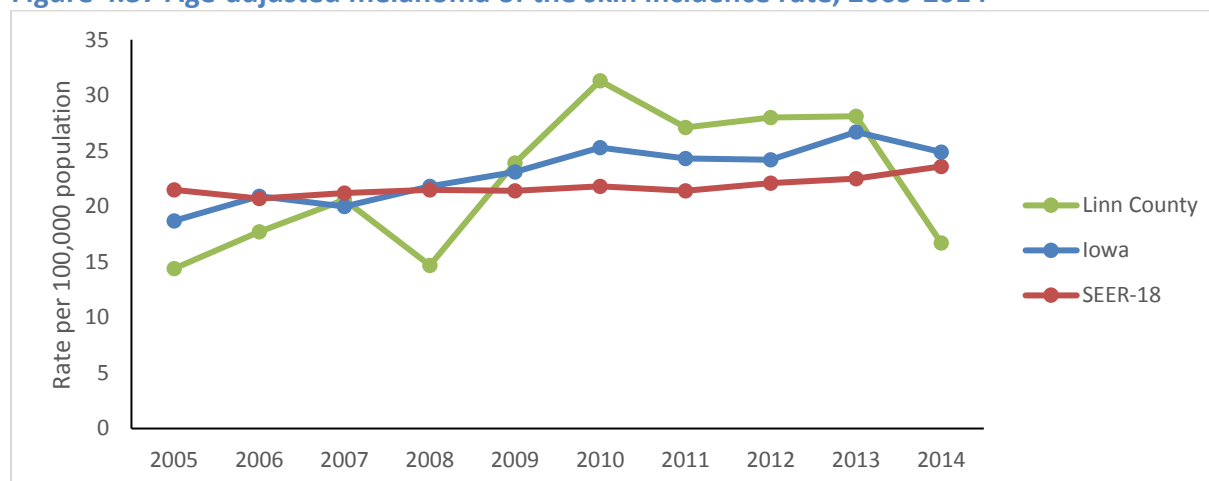
Linn County 2020 Goal

Reduce the mortality rate related to melanoma skin cancer to 2.3 deaths per 100,000 population, a 10% reduction from the 5-year average of 2.5 per 100,000 in 2006-2010.

Trends

From 2005 to 2014, incidence rates for melanoma of the skin (skin cancer) fluctuated demonstrating a high of 31.3 cases per 100,000 population in 2010 and low of 14.4 cases per 100,000 population in 2005 (Figure 4.37). A statistically significant increase was noted between 2008 and 2010, respectively increasing from 14.7 to 31.3 cases per 100,000 population. Between 2010 and 2014, there was a statistically significant decrease in the incidence falling to 16.7 cases per 100,000 population in 2014.

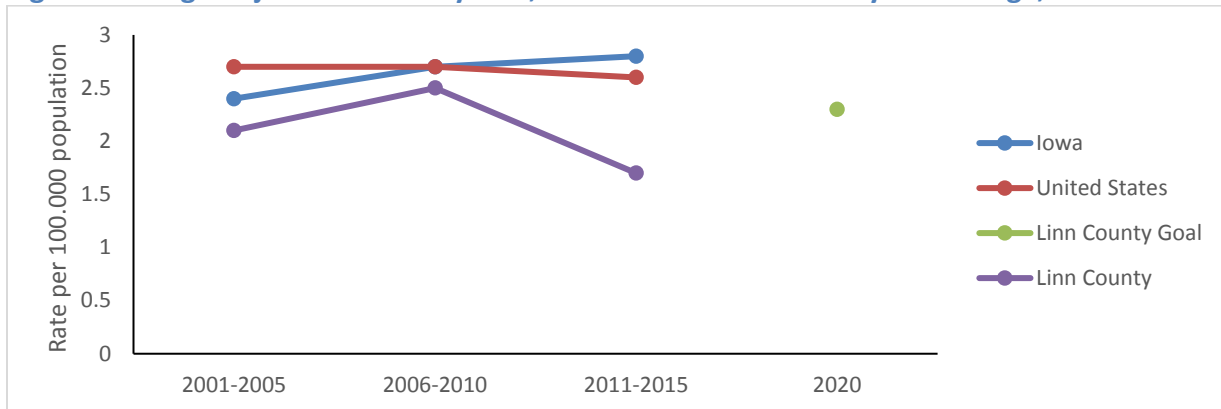
Figure 4.37 Age-adjusted melanoma of the skin incidence rate, 2005-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

In Linn County, there were too few deaths due to melanoma of the skin to calculate rates per year, so the 5-year average is used for trends from 2001 to 2015. Mortality rates for skin cancer increased slightly in Iowa, remained stable in the United States, and decreased in Linn County (Figure 4.38). The current mortality rate in Linn County for melanoma of the skin falls below the Linn County goal of 2.3 per 100,000 population with a rate of 1.7 deaths per 100,000 population.

Figure 4.38 Age-adjusted mortality rate, melanoma of the skin 5-year average, 2001-2015



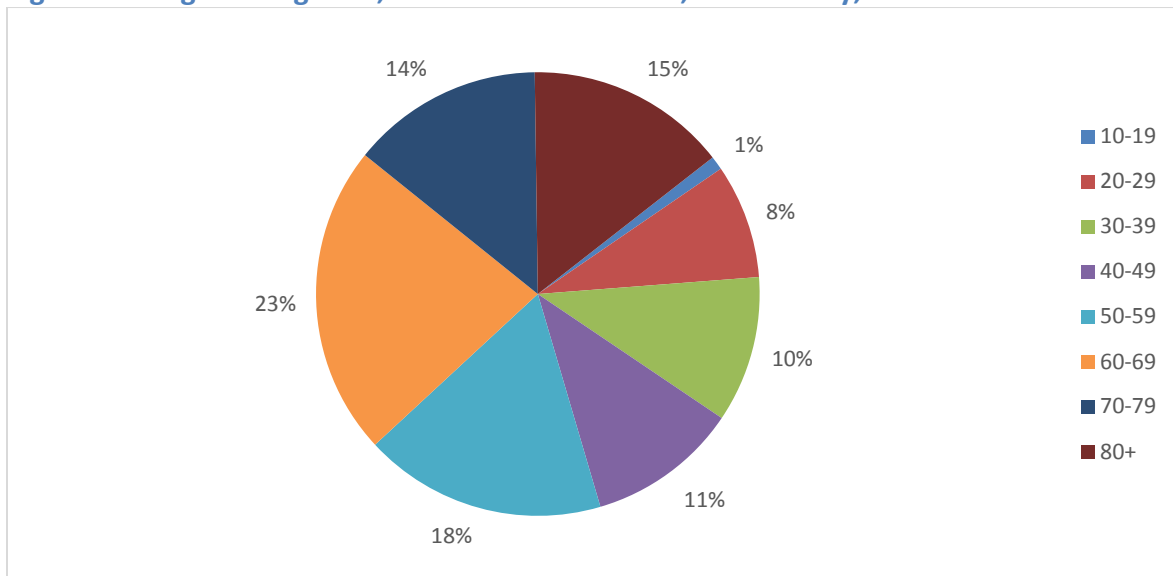
Source: Surveillance, Epidemiology, and End Results (SEER) Program

Disparities

Age

Skin cancer affects a wider range of age groups than other cancers. As seen in Figure 4.39, approximately 9% of diagnoses were among persons younger than 30 years of age.

Figure 4.39 Age at diagnosis, melanoma of the skin, Linn County, 2010-2014

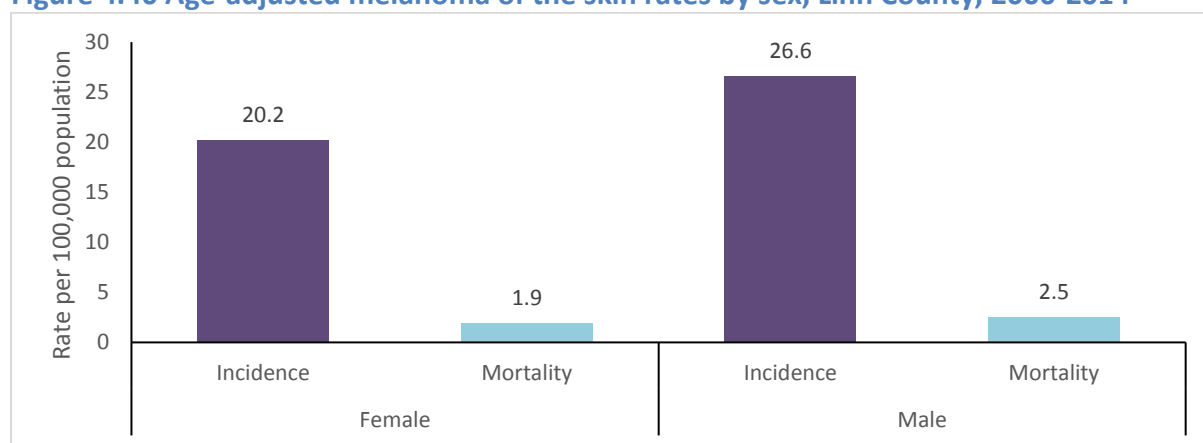


Source: Surveillance, Epidemiology, and End Results (SEER) Program

Sex and Race

Incidence and mortality rates in Linn County for melanoma of the skin are slightly higher for males than for females as well as among whites compared to blacks (Figure 4.40). From 2000 to 2014, males had an incidence rate of 26.6 cases per 100,000 while females had a rate of 20.2 per 100,000 population. During the same period, the age-adjusted incidence rate for melanoma of the skin was most prevalent among whites compared to blacks, with a rate of 20.1 cases of melanoma per 100,000 among white residents and 0 among black residents. Likewise, the mortality rate among white residents was 2.1 deaths per 100,000 population and 0 among black residents.

Figure 4.40 Age-adjusted melanoma of the skin rates by sex, Linn County, 2000-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

Risk Factors

Risk factors for melanoma of the skin include:

- Lighter natural skin color
- Family or personal history of skin cancer
- Exposure to the sun through work or play
- History of sunburns especially early in life
- History of indoor tanning
- Skin that burns, freckles, reddens easily, or becomes painful in the sun
- Blue or green eyes
- Blonde or red hair
- Certain types of or a large number of moles

Prostate

Linn County 2020 Goal

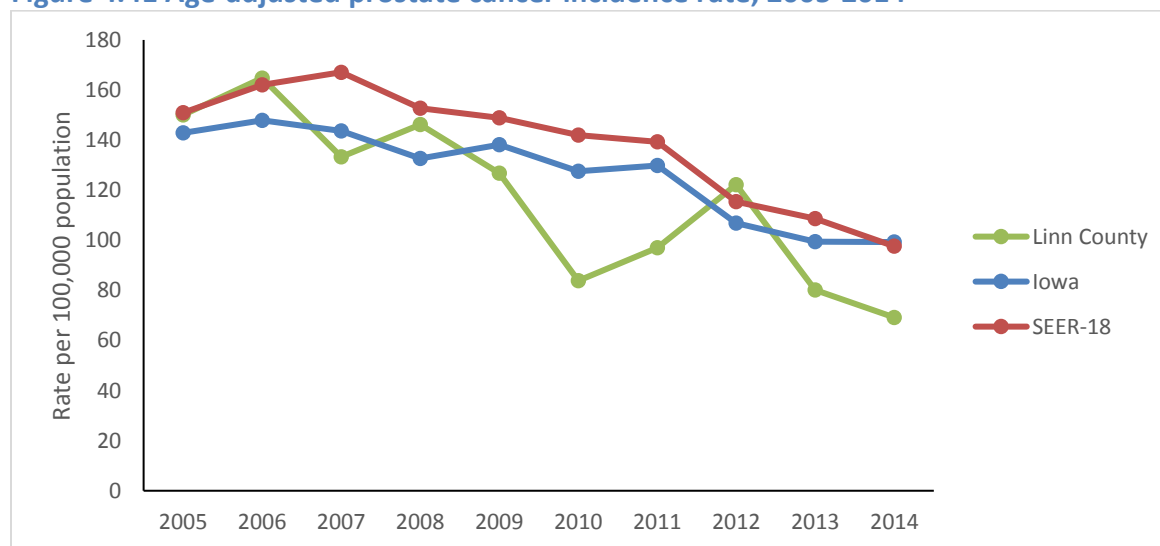
Reduce the prostate cancer mortality rate to 19 deaths per 100,000 population, a 10% reduction from the 3-year average of 21.2 per 100,000 in 2008-2010.

Trends

In 2014, the incidence rate for prostate cancer in Linn County was 69.2 per 100,000 population, a statistically significant decrease from 2012 with an incidence rate of 122.2 per 100,000 population (Figure 4.41). The Linn County rate has fluctuated the study period generally demonstrating a downward trend. There was a statistically significant decrease in the incidence of prostate cancer between 2009 and 2010 followed by a statistically significant increase in 2012. Since 2006, incidence rates have declined in Linn County, Iowa, and the SEER 18 registries.

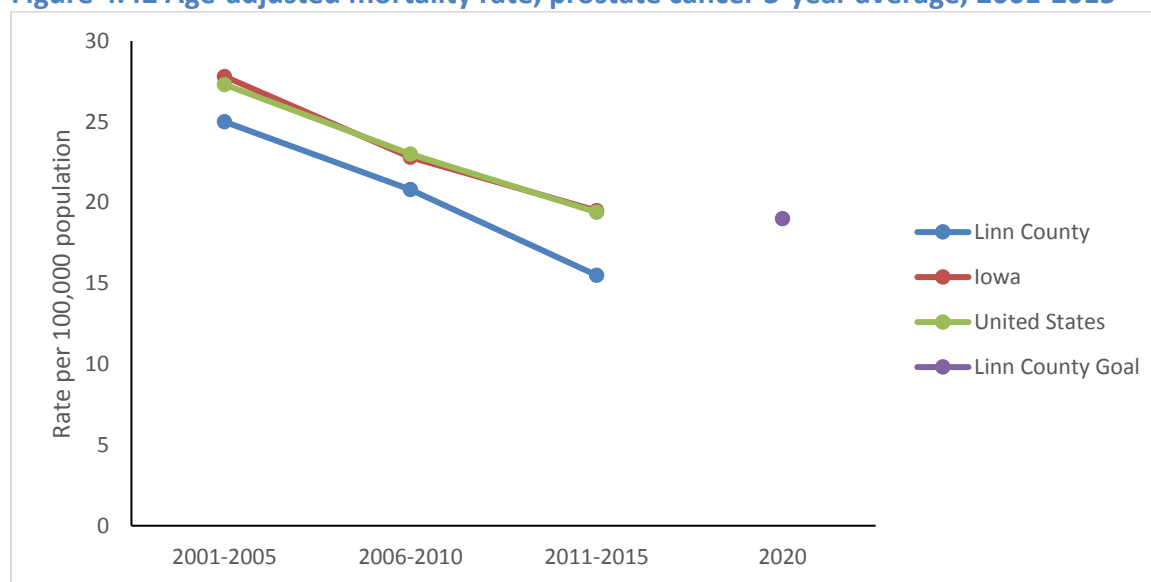
Due to small numbers of prostate cancer deaths in Linn County, the mortality rates were combined to create 5-year rates. Mortality rates in Linn County have declined from 2001-2005 to 2011-2015 and are similar to state and national rates (Figure 4.42). As of the 2011-2015 period, Linn County has surpassed the 2020 goal of 19.0 deaths per 100,000 population with a mortality rate of 15.5 per 100,000 population.

Figure 4.41 Age-adjusted prostate cancer incidence rate, 2005-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

Figure 4.42 Age-adjusted mortality rate, prostate cancer 3-year average, 2001-2015



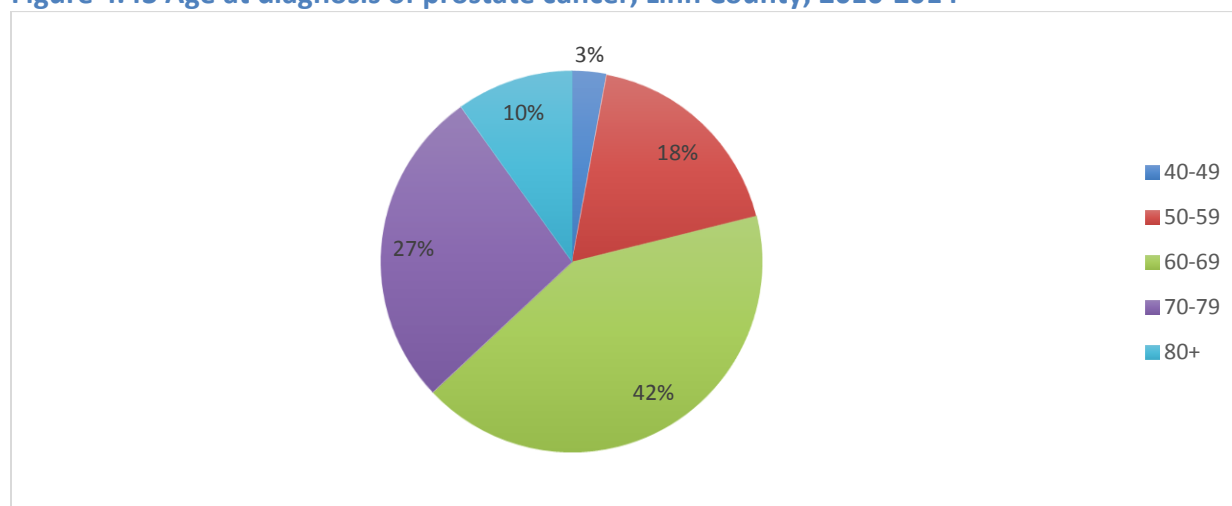
Source: Surveillance, Epidemiology, and End Results (SEER) Program

Disparities

Age

The risk of prostate cancer increases with age. Between 2010 and 2014, 97% of diagnoses were in men aged 50 years or older. However, the largest percentage of prostate cancer diagnoses was among men 60 to 69 years of age with 42% of diagnoses belonging to individuals within this age category (Figure 4.43).

Figure 4.43 Age at diagnosis of prostate cancer, Linn County, 2010-2014

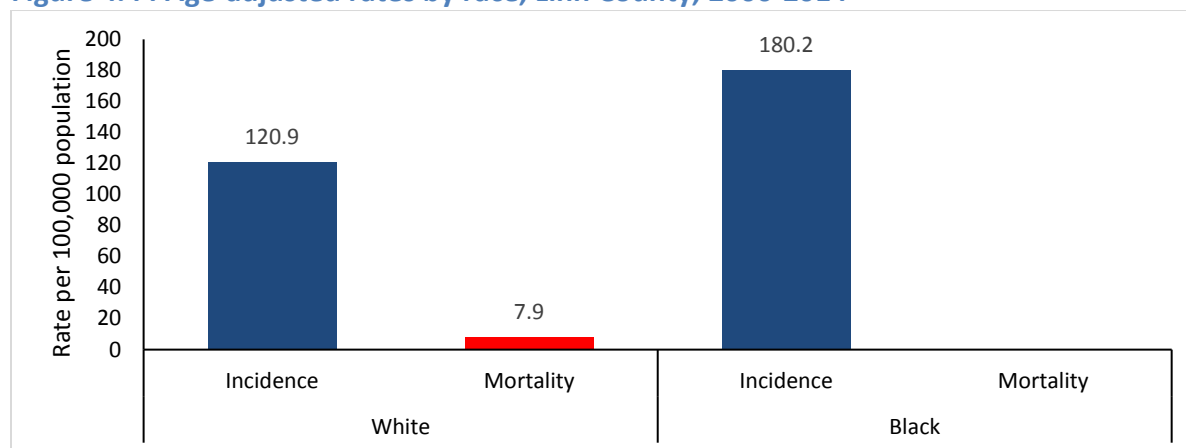


Source: Surveillance, Epidemiology, and End Results (SEER) Program

Race

From 2000 to 2014 in Linn County, black men had an incidence rate of 180.2 cases per 100,000 population while the incidence rate among white men was 120.9 cases per 100,000 (Figure 4.44). Mortality rates were too low among black men in Linn County to have a stable rate to compare to white men; however, national data shows that black men have higher mortality rates than men of any other race.¹⁵

Figure 4.44 Age-adjusted rates by race, Linn County, 2000-2014



Source: Surveillance, Epidemiology, and End Results (SEER) Program

*Counts are too few for a stable age-adjusted rate

Risk Factors

Risk factors for prostate cancer include age, black or African-American race, and history of prostate cancer in a father or brother.

Health Interventions

Two tests that are commonly used to screen for prostate cancer, the digital rectal exam (DRE) and prostate specific antigen test (PSA). The U.S. Preventive Services Task Force recommends against using the PSA test for prostate cancer because of the significant potential emotional harms resulting from over-screening that can occur from PSA screening.¹⁶ The American Cancer Society recommends that men talk with their health care provider about the uncertainties, risks, and potential benefits of the PSA test before deciding whether to have the test performed.¹⁷

¹⁵ Prostate Cancer Rates by Race and Ethnicity. Centers for Disease Control and Prevention. [Online] August 12, 2013. [Cited: December 11, 2013.] <http://www.cdc.gov/cancer/prostate/statistics/race.htm>.

¹⁶ U.S. Preventive Services Task Force. *Screening for Prostate Cancer Current Recommendation*. [Online] May 2012. [Cited December 11, 2013]. <http://www.uspreventiveservicestaskforce.org/prostatecancerscreening.htm>

¹⁷ Wolf et al. *American Cancer Society Guideline for Early Detection of Prostate Cancer*. CA: Cancer J Clin. 2010; 60:70-98.

Heart Disease and Stroke

Heart Disease

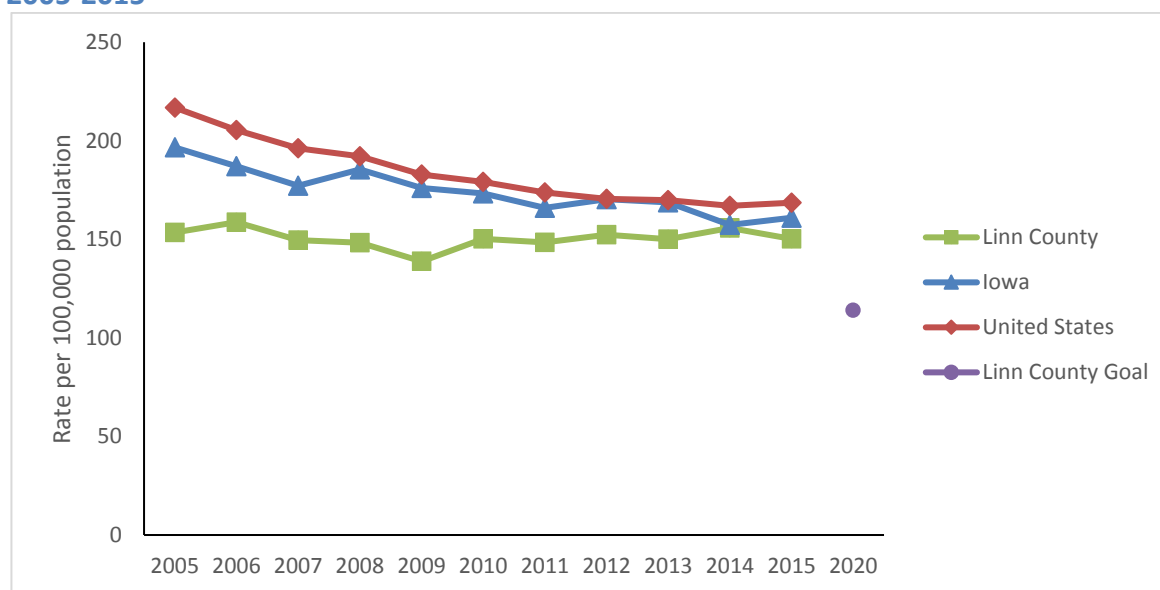
Linn County 2020 Goal

Reduce the heart disease mortality rate to 114 deaths per 100,000 population, a 20% decrease from 142.5 deaths per 100,000 population in 2010.

Trends

In 2015, the age-adjusted mortality rate due to heart disease was 150.2 deaths per 100,000 population among Linn County residents. Between 2005 and 2015, the age-adjusted mortality rates for heart disease declined in Iowa and the United States. However, over this period the mortality rate in Linn County remained stable, with a slight decline in 2009. The mortality rate for heart disease is consistently less in Linn County compared to Iowa and the United States (Figure 4.45).

Figure 4.45 Age-adjusted heart disease mortality rates, Linn County, Iowa and United States 2005-2015

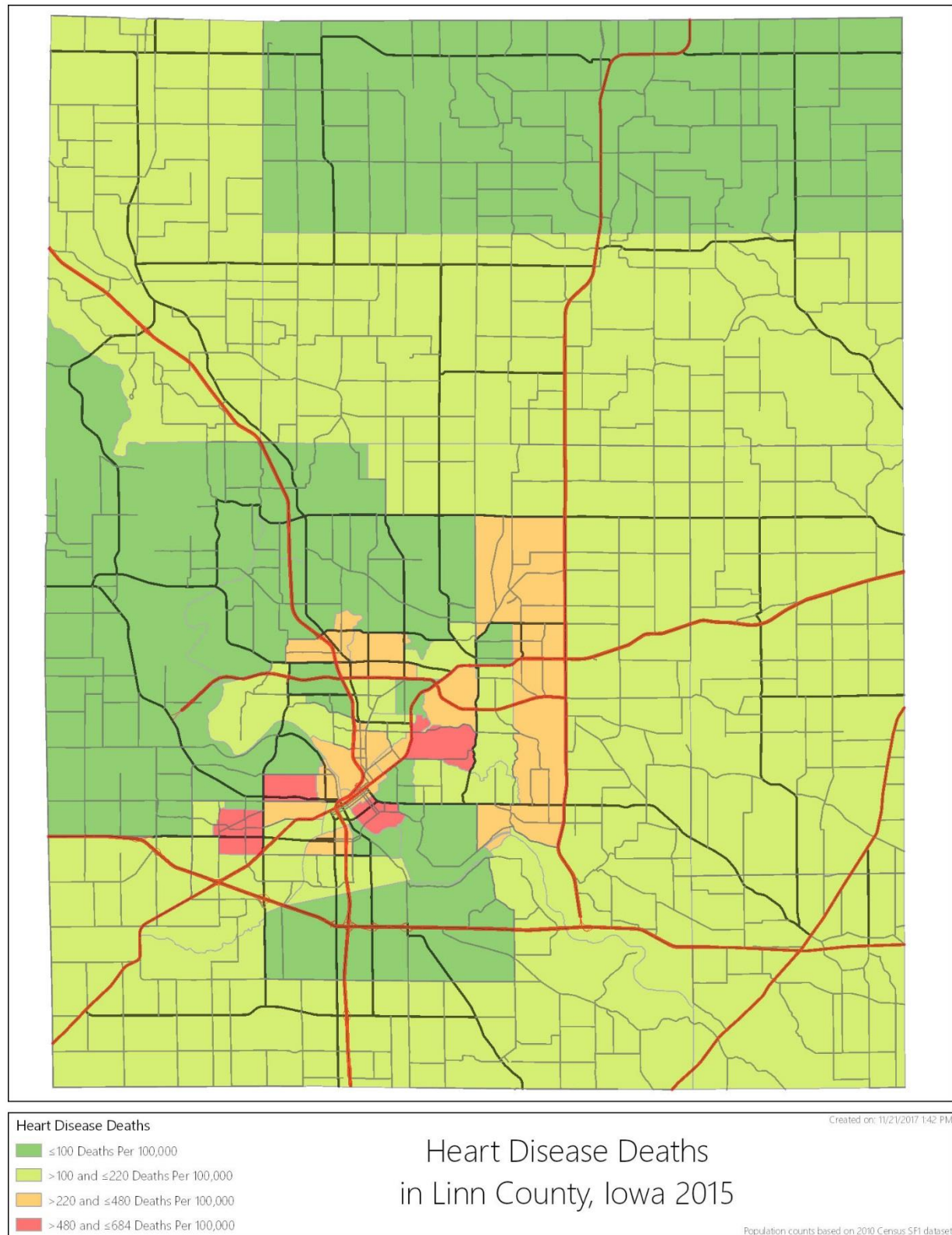


Source: CDC WONDER

Geographical Variation

Figure 4.46 displays heart disease deaths by census tract in Linn County. Areas shaded red and orange had more deaths, areas shaded green had fewer deaths.

Figure 4.46 Linn County heart disease deaths, 2015



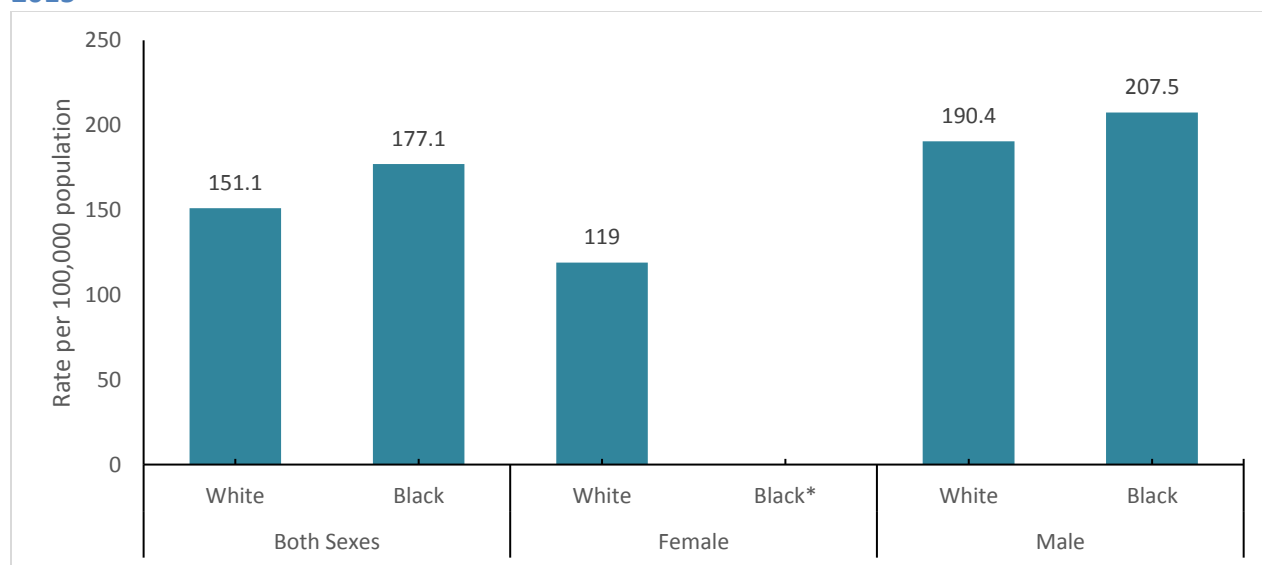
Source: Vital Records, Bureau of Health Statistics, Iowa Department of Public Health

Disparities

Sex and Race

Males in Linn County tend to have a higher mortality rate related to heart disease than females, as do black compared to white residents. From 2011 to 2015, black males had the highest mortality rate compared to other groups with a rate of 207.5 deaths per 100,000 population (Figure 4.47).

Figure 4.47 Age-adjusted mortality rates for heart disease by sex and race, Linn County, 2011-2015



Source: CDC WONDER

*Counts are too low to calculate a stable age-adjusted mortality rate

Risk Factors

Risk factors of heart disease include hypertension, high cholesterol, diabetes, obesity, smoking, physical inactivity, diet high in saturated fats and cholesterol, excessive alcohol use, and family history.

Stroke

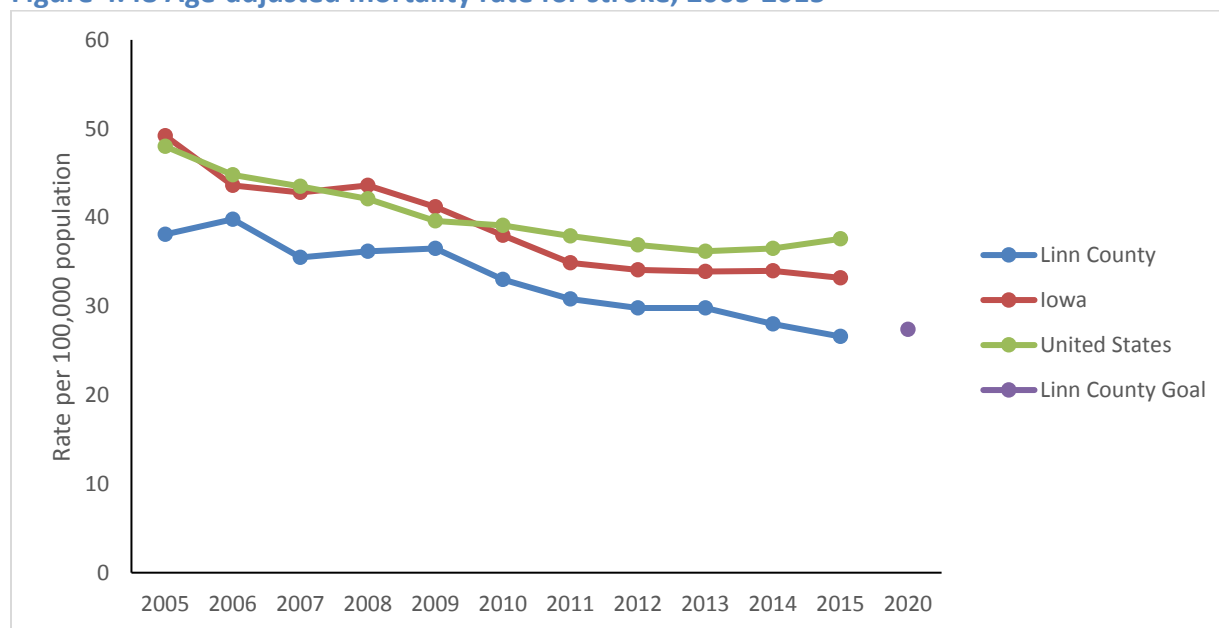
Linn County 2020 Goals

Reduce stroke deaths to 27.4 per 100,000 population, a 20% reduction from the 3-year average of 34.2 per 100,000 in 2009-2011.

Trends

In 2015, the mortality rate for stroke was 26.6 deaths per 100,000 population. From 2005 to 2015, the age-adjusted mortality rate for stroke in Linn County was less than the state and national rates (Figure 4.48). However, a decline in mortality rate overtime is noted across all three geographic locations.

Figure 4.48 Age-adjusted mortality rate for stroke, 2005-2015

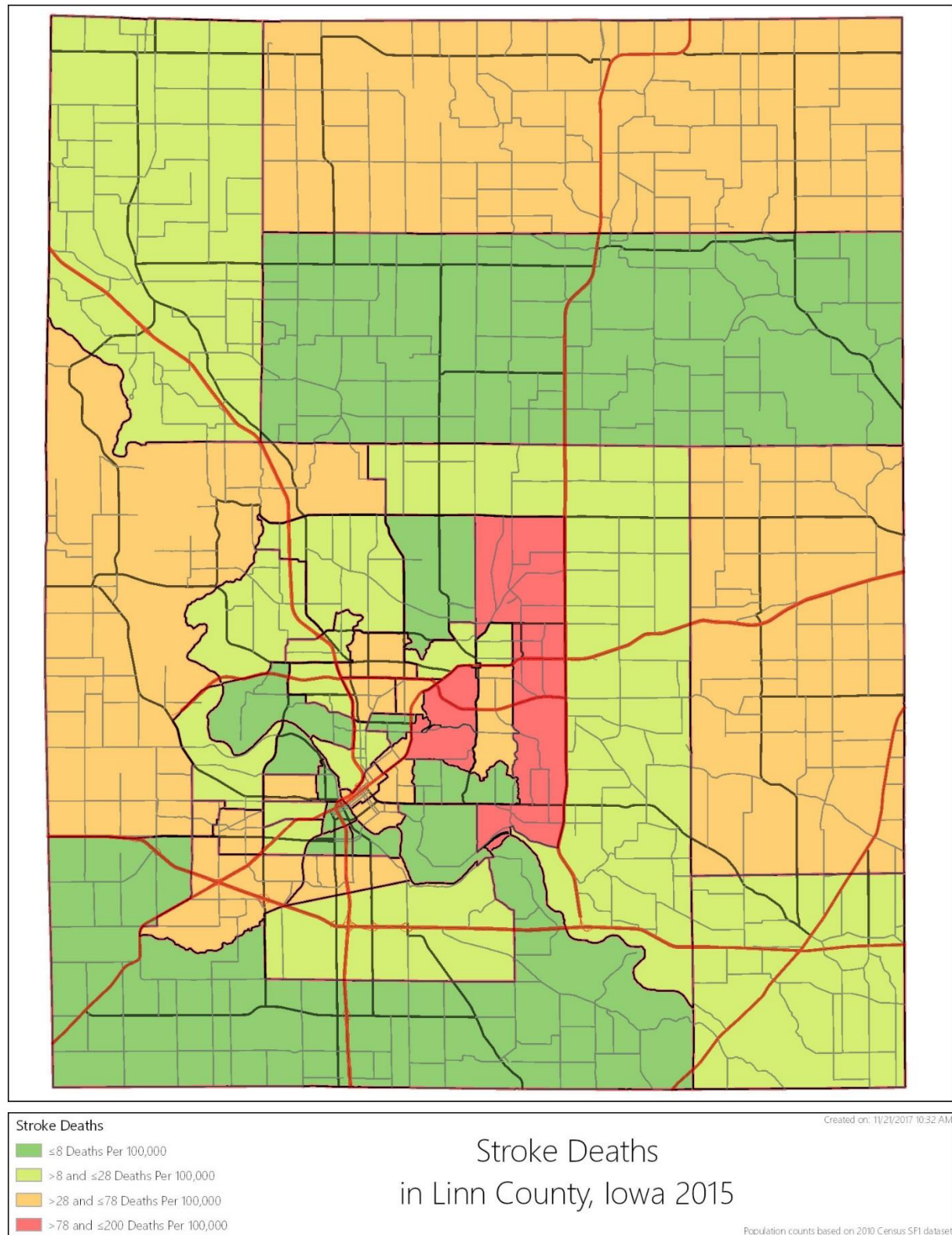


Source: Iowa Public Health Tracking Portal, CDC WONDER

Geographical Variation

Figure 4.49 displays stroke deaths by census tract in Linn County. Areas shaded red and orange had more deaths, areas shaded green had fewer deaths.

Figure 4.49 Linn County stroke deaths, 2015



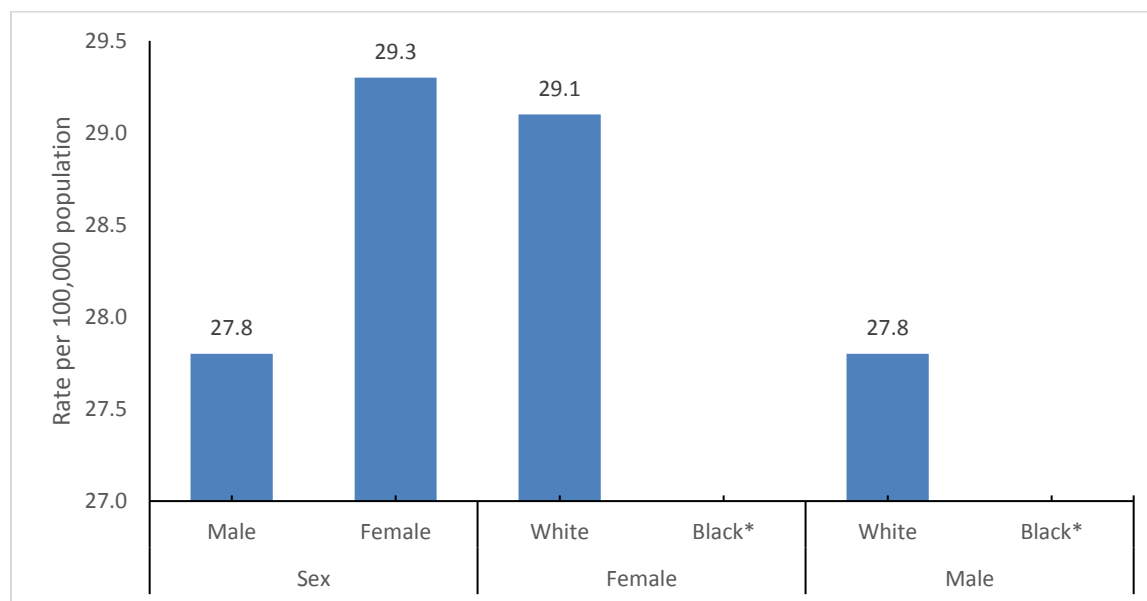
Source: Vital Records, Bureau of Health Statistics, Iowa Department of Public Health,

Disparities

Sex and Race

Age-adjusted mortality rates for stroke are generally higher among black residents in Iowa; however, due to a small number of deaths among black residents in Linn County the rates have been suppressed. Mortality rates among males and females in Linn County do not differ significantly. As seen in Figure 4.50, between 2011 and 2015 females had a slightly larger mortality rate related to stroke compared to their male counterparts.

Figure 4.50 Age-adjusted mortality rates for stroke by sex, Linn County, 2011-2015



Source: CDC WONDER

*Counts are too low to calculate a stable age-adjusted mortality rate

Risk Factors

Risk Factors for stroke include: high blood pressure, high blood cholesterol, heart disease, diabetes, overweight/obesity, previous stroke or transient ischemic attack (TIA), sickle cell disease, tobacco use, alcohol use, physical inactivity, family history, age of 65 years or over, male sex, black or African-American race, Hispanic ethnicity, and American Indian/Alaska Native race.

Diabetes

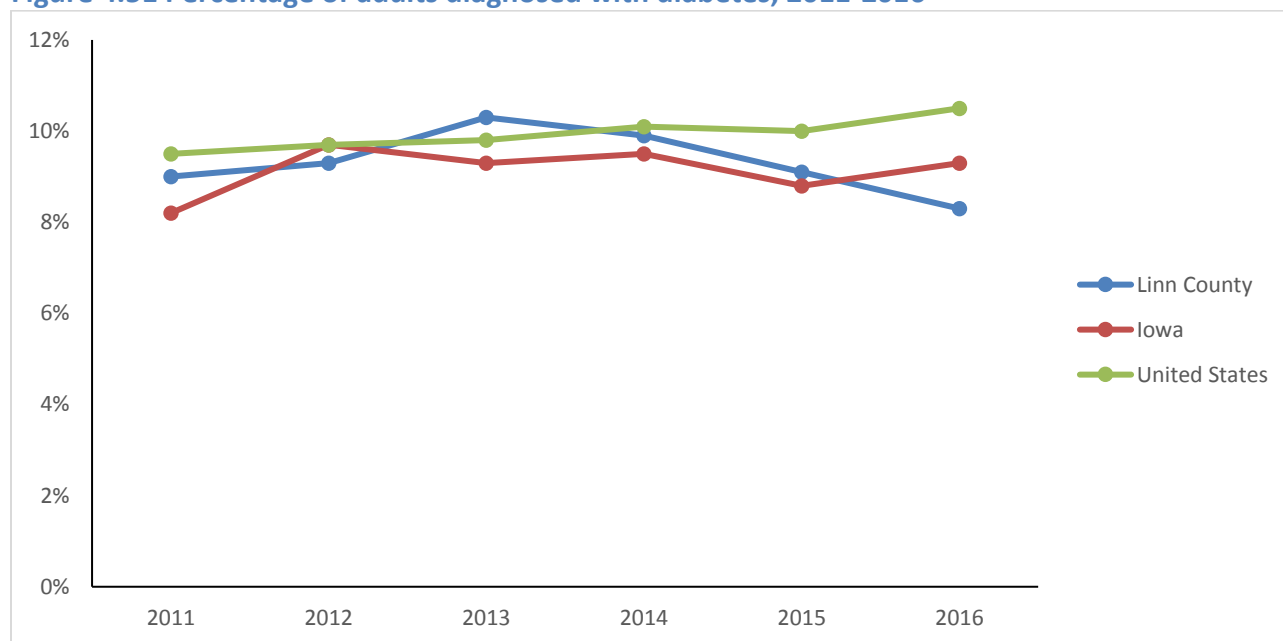
Linn County 2020 Goal

Reduce the diabetes mortality rate to 15.2 deaths per 100,000 population, a 10% decrease from the 3-year average of 16.9 per 100,000 from 2009-2011.

Trends

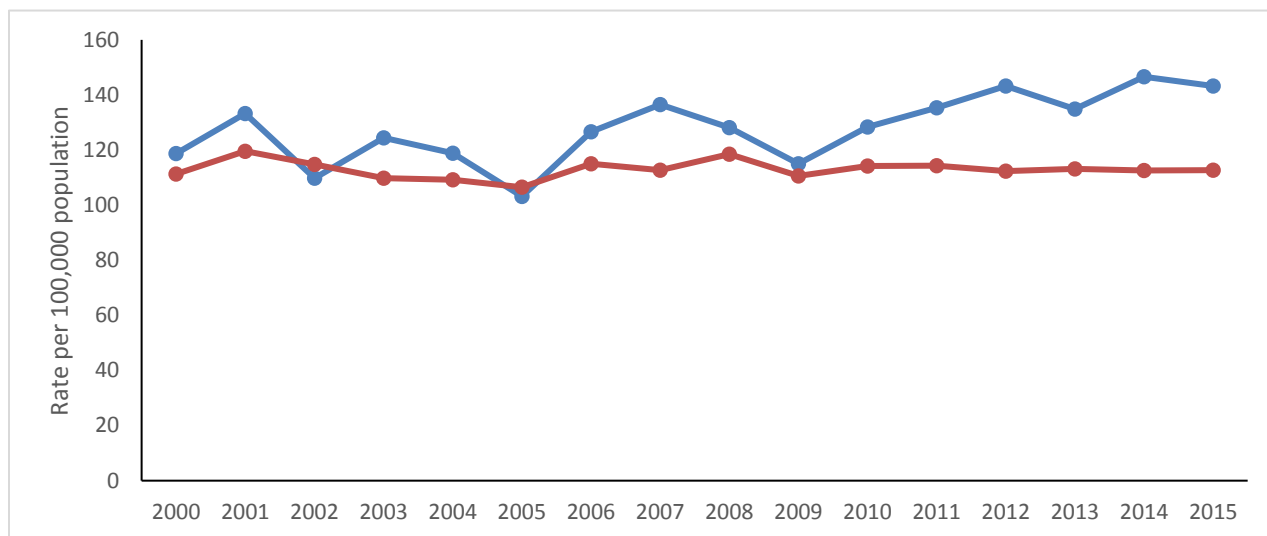
According to the Behavioral Risk Factor Surveillance System (BRFSS) survey, the percent of adults in Linn County who have a known diagnosis of diabetes is slightly increasing in Iowa and the United States, but decreasing in Linn County. Between 2013 and 2016, the percentage of adults who reported having a known diabetes diagnosis decreased from 10.3% to 8.3%, respectively (Figure 4.51). While diagnoses are decreasing in Linn County, the hospitalization rate is on the rise. Between 2009 and 2015, the hospitalization rate increased from 115.0 per 100,000 population to 143.3 per 100,000 population; an increase of approximately 28 diabetes related hospitalizations per 100,000 population (Figure 4.52). Likewise, mortality rates related to diabetes are increasing, demonstrating a statistically significant increase between 2012 and 2015 (Figure 4.53). During this time, the mortality rate increased from 13.2 to 31.4 deaths per 100,000 population.

Figure 4.51 Percentage of adults diagnosed with diabetes, 2011-2016



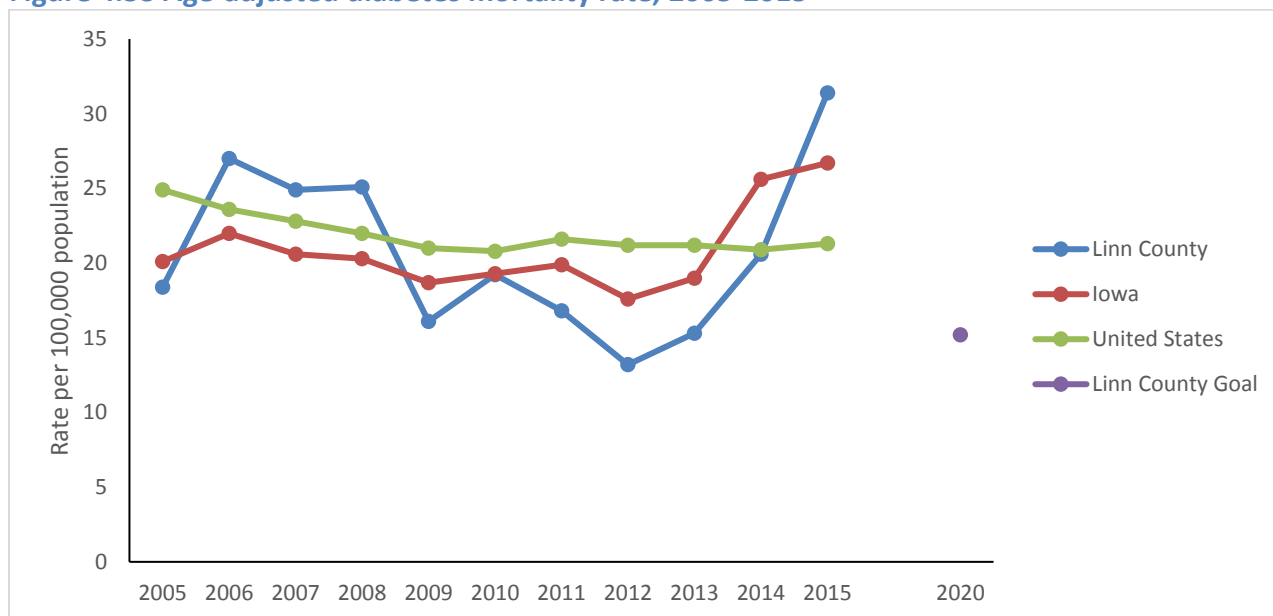
Source: BRFSS

Figure 4.52 Age-adjusted diabetes hospitalization rate, 2000-2015



Source: Iowa Public Health Tracking Portal

Figure 4.53 Age-adjusted diabetes mortality rate, 2005-2015



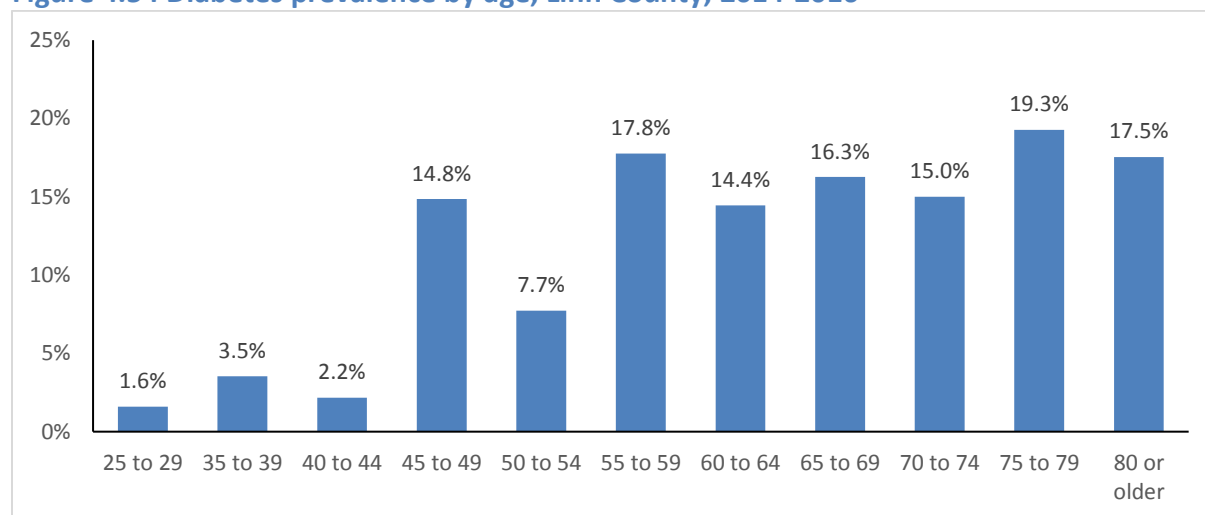
Source: Iowa Public Health Tracking Portal

Disparities

Age

The percentage of the population with a diabetes diagnosis in Linn County increased with age. Of the Linn County population, the highest percentage of individuals with a diabetes diagnosis were among those 75 to 79 years of age with 19.3% of the population with a known diabetes diagnosis (Figure 4.54). However, the prevalence did not differ significantly from the other age groups over the age of 45 years.

Figure 4.54 Diabetes prevalence by age, Linn County, 2014-2016

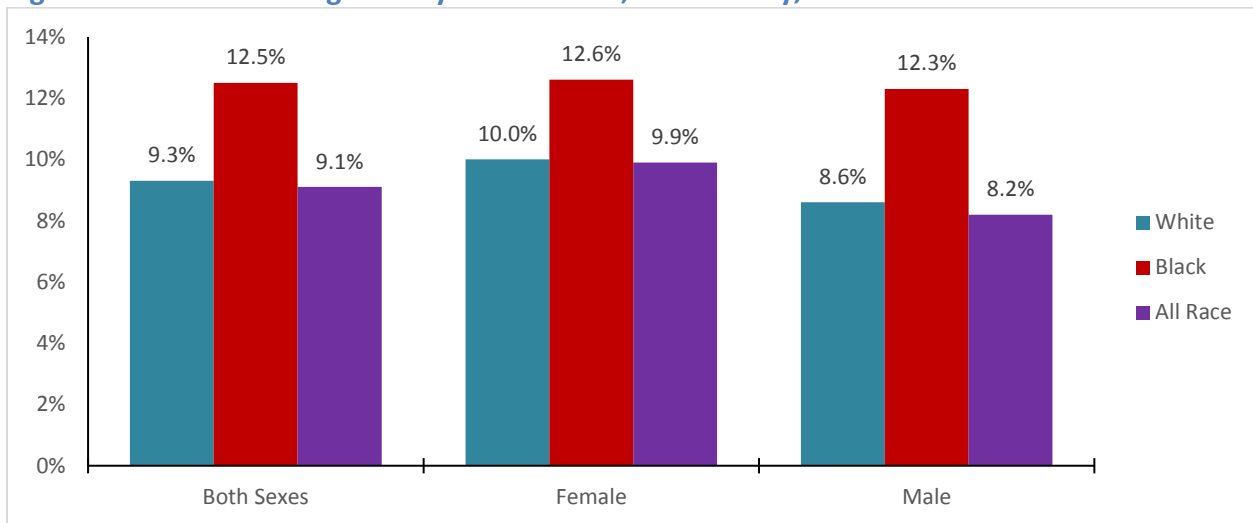


Source: BRFSS

Sex and Race

Between 2014 and 2016, an average of 9.1% of the adult population had a diabetes diagnosis (Figure 4.55). Of the individuals with diabetes, white and black females had a slightly higher diabetes diagnosis than males. While there are a smaller number of diabetes diagnoses among black compared to white adults, a higher percentage of black residents have an identified diabetes diagnoses compared to the total population of black residents. For all races combined, females have more diabetes diagnoses than males, at 9.9% vs. 8.2%.

Figure 4.55 Diabetes diagnosis by sex and race, Linn County, 2014-2016



Source: Iowa Public Health Tracking Portal, BRFSS

Risk Factors

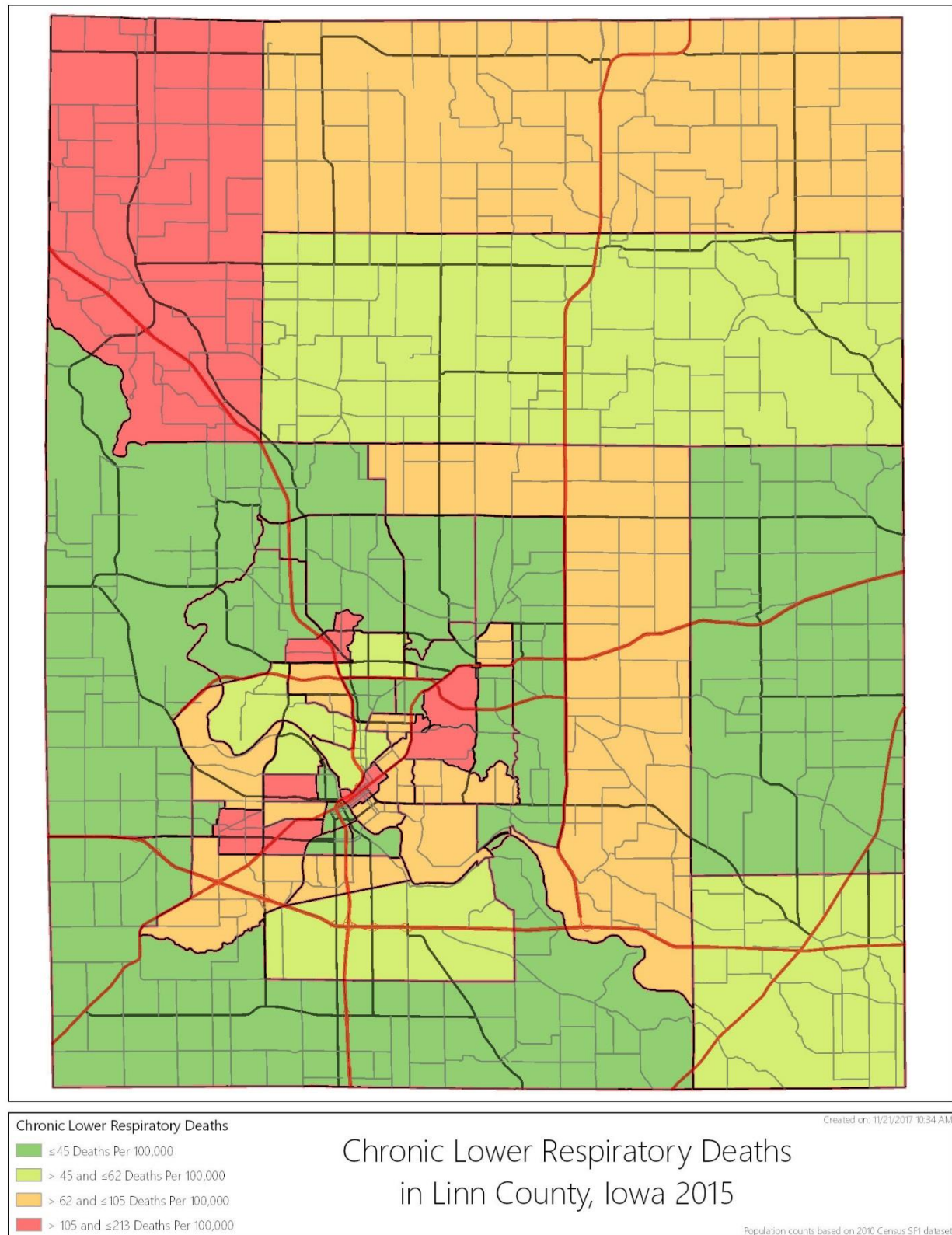
Risk factors for diabetes include age, obesity, family history, history of gestational diabetes, impaired glucose tolerance, physical inactivity and African American, Hispanic, or American Indian race.

Respiratory Conditions

Geographical Variation

Figure 4.56 displays cancer deaths by census tract in Linn County. Areas shaded red and orange had more deaths, areas shaded green had fewer deaths.

Figure 4.56 Linn County chronic lower respiratory disease deaths, 2015



Source: Vital Records, Bureau of Health Statistics, Iowa Department of Public Health

Asthma

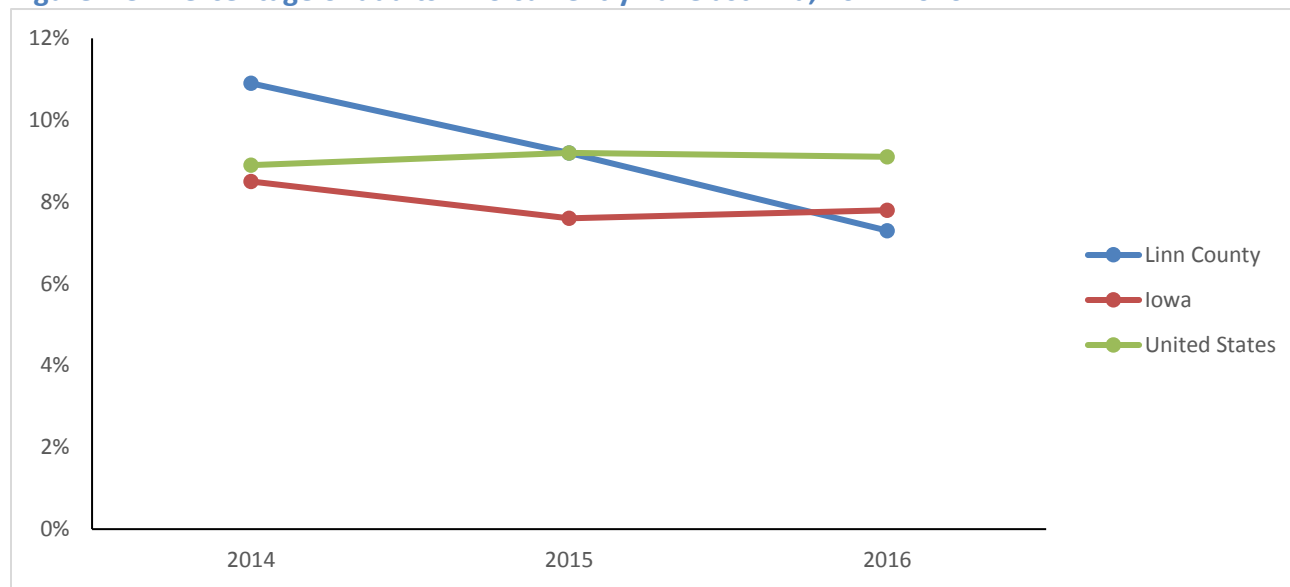
Linn County 2020 Goal

Reduce hospitalizations due to asthma to 65.9 per 100,000 population, a 20% reduction from the 3-year average of 82.3 per 100,000 in 2009-2011.

Trends

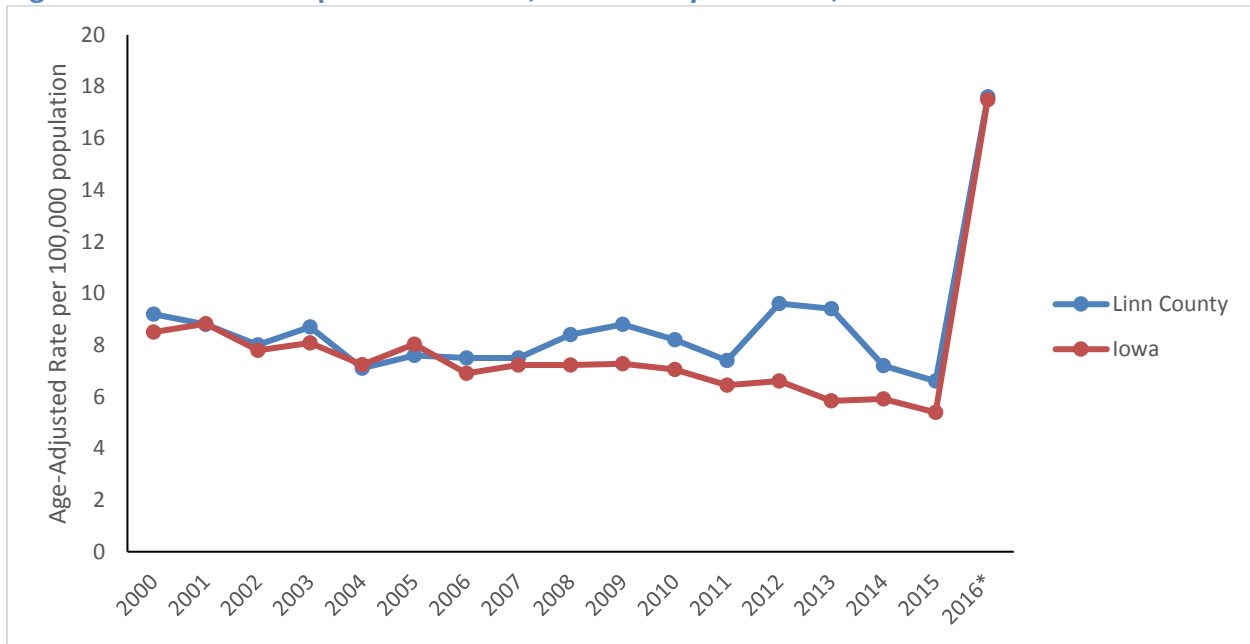
The percentage of adults in Linn County who have ever been told they have asthma decreased between 2014 and 2016, decreasing from 10.9% to 7.3% respectively (Figure 4.57). The percentage of adults who currently have asthma in Linn County is similar to that in Iowa and the United States. The asthma hospitalization rate in Linn County overtime tends to be slightly higher than Iowa (Figure 4.58). However, in 2016 both Iowa and Linn County demonstrated a similar rate of 17.6 per 100,000 population in Linn County and 17.5 per 100,000 population in Iowa; a sharp increase from the hospitalization rate in 2015. This sharp increase was due to a shift in hospital coding from ICD-9-CM to ICD-10-CM, which occurred in October of 2015. The new ICD-10 codes are more inclusive of the respiratory events coded under asthma. As such, the rates appear inflated. Caution should be used when interpreting 2016 data compared to previous years.

Figure 4.57 Percentage of adults who currently have asthma, 2014-2016



Source: BRFSS

Figure 4.58 Asthma hospitalization rate, Linn County and Iowa, 2000-2016



Source: Iowa Public Health Tracking Portal

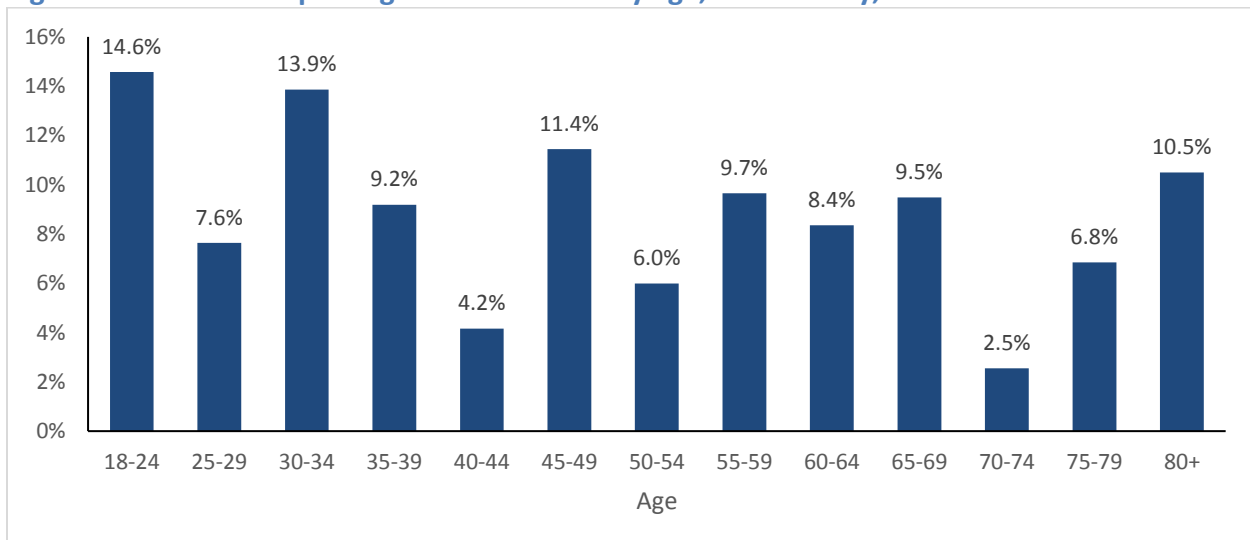
*Change in hospital coding from ICD-9-CM to ICD-10-CM codes

Disparities

Age

From 2014-2016, the greatest percentage of asthma in adults of different age groups is among those aged 25 to 29 years of age, at 9% (Figure 4.59).

Figure 4.59 Percent reporting current asthma by age, Linn County, 2014-2016

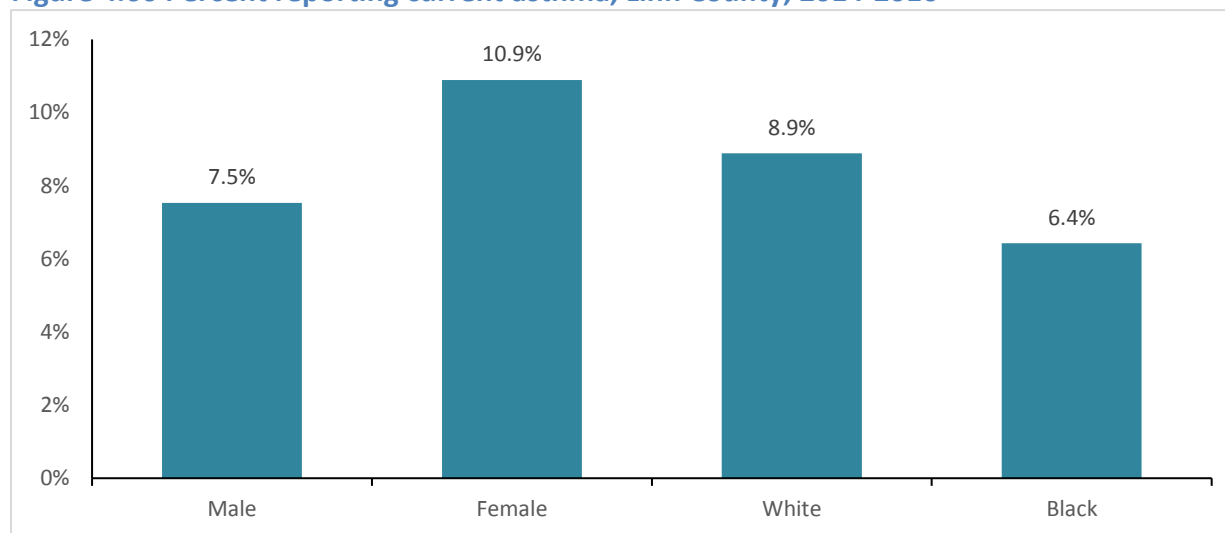


Source: BRFSS

Sex and Race

Of those in Linn County who reported current asthma, female and white residents demonstrated a higher proportion of asthma compared to male and black residents. The overall percentage of asthma among all races and both sexes is 7.3%, while the percentage among females is 10.9 % and white residents is 8.9% (Figure 4.60).

Figure 4.60 Percent reporting current asthma, Linn County, 2014-2016

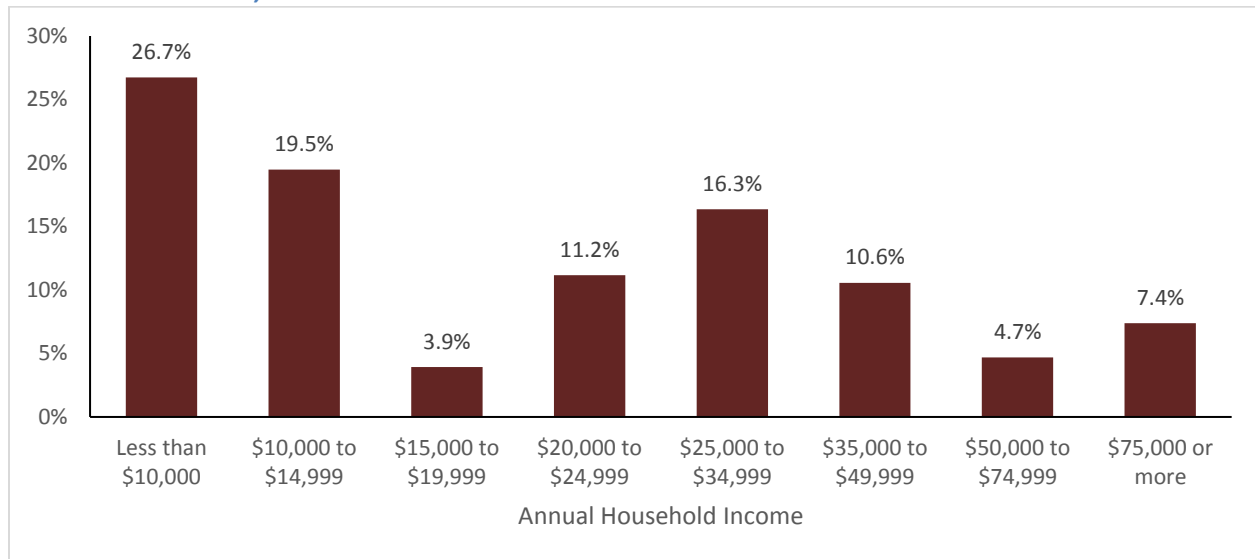


Source: Iowa Public Health Tracking Portal, BRFSS

Household Income

In Linn County, asthma prevalence is inversely correlated with household income. In households with an annual income of less than \$10,000, the percent of the population with current asthma is 26.7%, compared to 7.4% of households with an annual income of \$75,000 or more (Figure 4.61).

Figure 4.61 Percent of Linn County population reporting currently having asthma by household income, 2014-2016



Source: BRFSS

Risk Factors

Among people living with asthma, risk factors or triggers for an asthma attack include pollen, mold, animal dander, cockroach allergens, dust mites, exercise, tobacco smoke, air pollution, and respiratory infections.

Chronic Obstructive Pulmonary Disease (COPD)

Linn County 2020 Goal

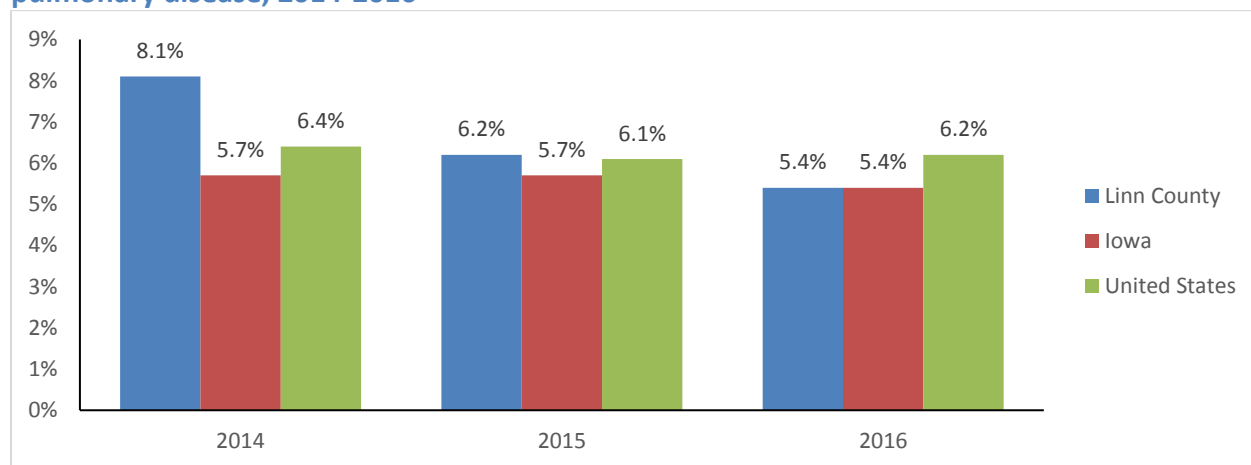
Reduce hospitalizations for COPD to 125.1 per 100,000 population, a 10% reduction from the 3-year average of 139 per 100,000 in 2009-2011.

Reduce deaths from COPD among adults to 42.2 per 100,000 population, a 10% reduction from the 3-year average of 46.9 per 100,000 in 2009-2011.

Trends

In 2016, 5.4% of Linn County residents reported they had been told they have COPD (Figure 4.62). Between 2014 and 2016, the percentage of adult residents with COPD decreased by nearly half in Linn County. During this period, the prevalence in Iowa and the United States remained stable.

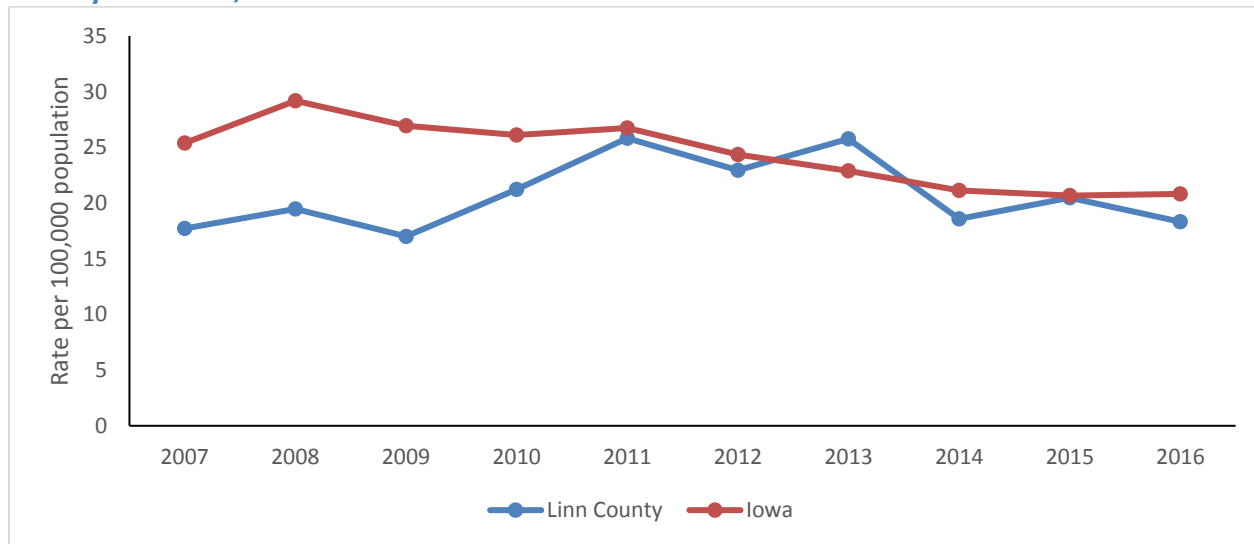
Figure 4.62 Percent of adults who have ever been told they have chronic obstructive pulmonary disease, 2014-2016



Source: BRFSS

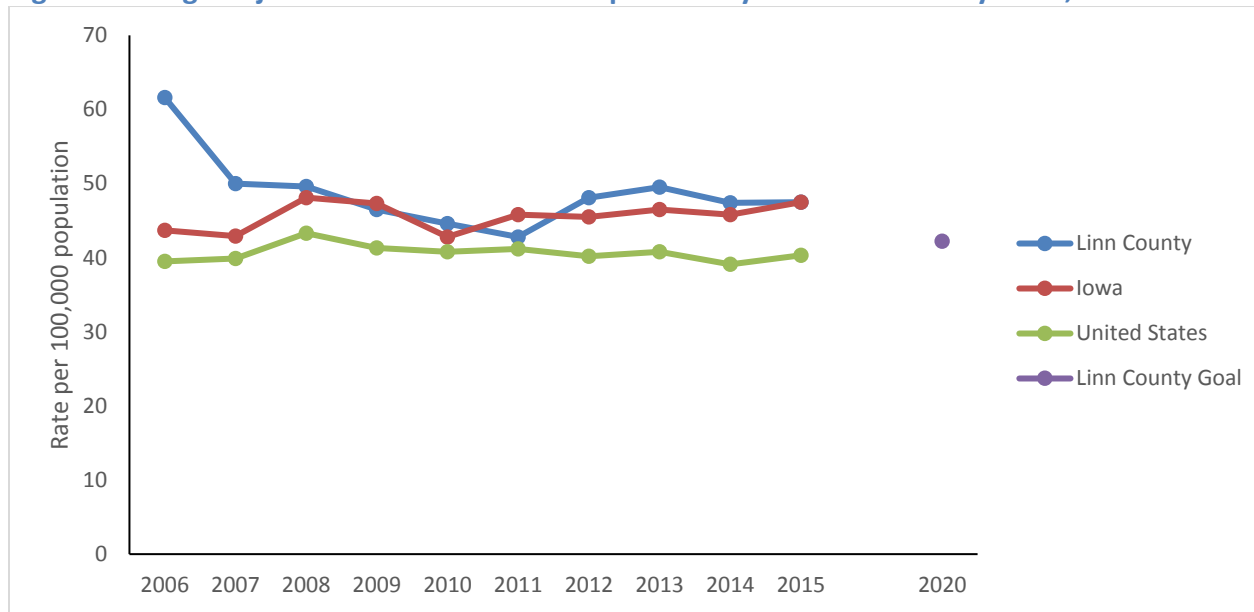
In 2016, the age-adjusted hospitalization rate for COPD in Linn County was 18.32 per 100,000 population. This was lower than Iowa's rate of 20.81 per 100,000 (Figure 4.63). Linn County's hospitalization rate has fluctuated slightly overtime, with a high of 25.82 per 100,000 population in 2011 and a low of 19.46 per 100,000 population in 2008. Between 2006 and 2015, the mortality rate due to COPD in Linn County decreased from 61.6 per 100,000 population to 47.5 per 100,000. However, the change over this period was not statistically significant. The mortality rate in Linn County and Iowa continue to be slightly higher than the United States (Figure 4.64).

Figure 4.63 Age-adjusted hospitalization rate for chronic obstructive pulmonary disease, Linn County and Iowa, 2007-2016



Source: Iowa Public Health Tracking Portal

Figure 4.64 Age-adjusted chronic obstructive pulmonary disease mortality rates, 2006-2015



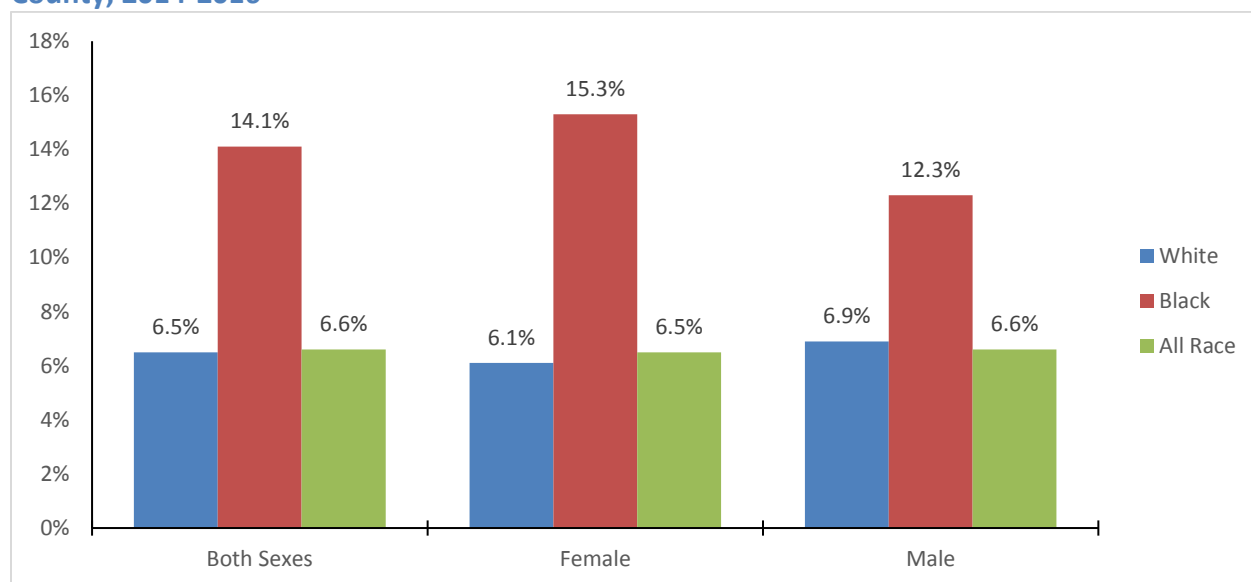
Source: CDC WONDER (ICD 10: J40-44)

Disparities

Sex and Race

Black residents had a greater percentage of COPD diagnoses compared to white residents, with 14.1% of all black residents and 6.5% of white residents having a COPD diagnosis. The largest percentage of COPD diagnoses was among black females with 15.3% having a COPD diagnoses between 2014 and 2016 (Figure 4.65). No significant difference was identified in the prevalence of COPD among individuals of all races by sex.

Figure 4.65 Percentage of chronic obstructive pulmonary disease by race and sex, Linn County, 2014-2016



Source: BRFSS

Risk Factors

Risk factors for COPD include tobacco smoke exposure, air pollutant exposure, asthma, genetic factors and respiratory infections.

Summary

Obesity rates are steadily increasing among Linn County, Iowa and the United States population. In Linn County, the leading cause of death is cancer; however, the all site cancer mortality rate is decreasing. The cancer with the highest incidence rate in Linn County is female breast cancer, followed by prostate cancer, lung cancer, colorectal cancer, and skin cancer. Among the top five cancer types, lung cancer has the highest mortality rate in the county. Both incidence and mortality age-adjusted rates for all-site cancer is higher among blacks and males than whites and females. Mortality rate for heart disease has remained stable overtime and is decreasing for stroke. Hospitalization and mortality rate for diabetes is increasing. In Linn County, the percentage of the population with an asthma diagnosis is decreasing, as was the hospitalization rate. However, the shift in coding of inpatient and outpatient visits in 2016 makes current hospitalization rates difficult to compare to previous years. Diagnosis, hospitalization, and mortality related to COPD are all decreasing.